THE AMERICAN GASLIGHT JOURNAL AND CHEMICAL REPERTORY

Devoted to the Interests of Illumination, Heating, Ventilation and Sanitary Improvement, Domestic Economy, and General Science.

PUBLISHING OFFICE, No. 42 PINE STREET.

VOLUME XII.—No. 9. WHOLE No. 249. | NEW YORK, MONDAY, MAY 2, 1870. | $3 PER ANNUM IN ADVANCE.

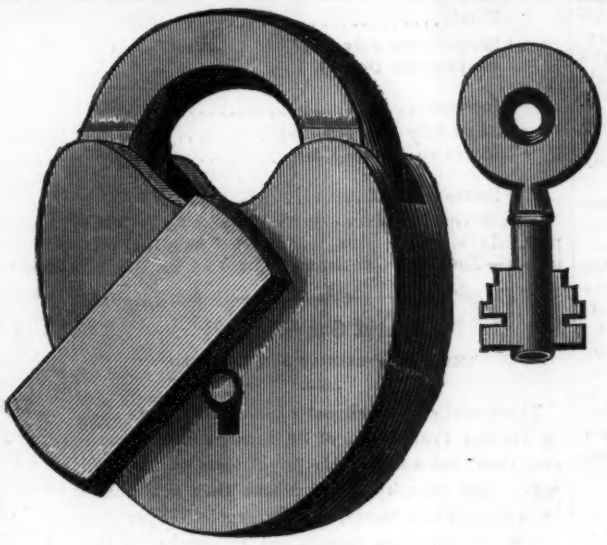
Pye's Patent Locks.

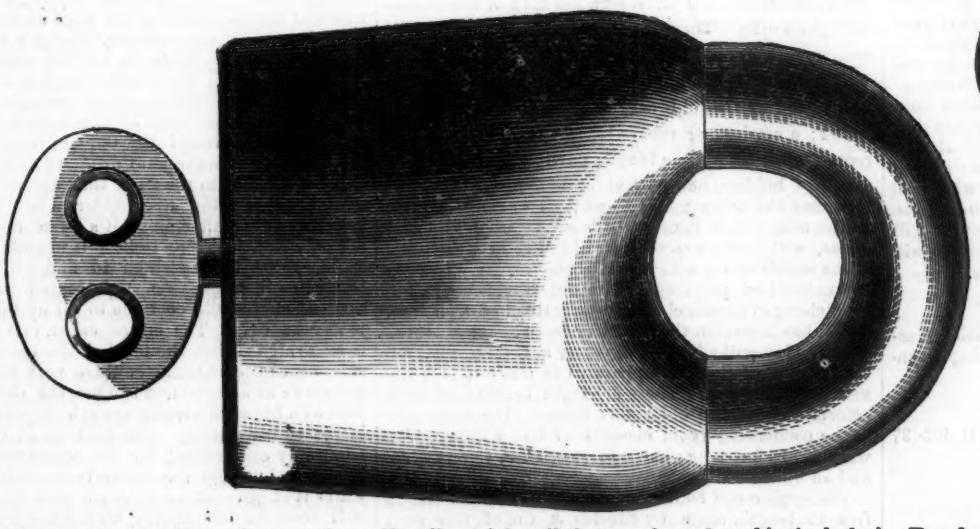
Locks are of great antiquity. The angel with flaming sword, at the gate of Eden, was the first example of an automatic lock.

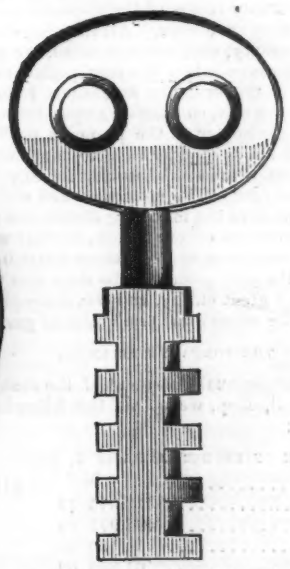
It was conceded about twelve years since in the United States, by all locksmiths, that a lock having a series of tumblers or slides, such as was used at that time in Europe, and more particularly those of Barron and Chubb, was secure against all known means of picking, or of forming a false key by any knowledge that could be obtained through the key-hole.

Mr. Andrews constructed a lock similar to that made by Mr. Chubb, having a series of tumblers and a detector. This lock was in great repute in the United States, and was placed on the doors of nearly all the principal banking establishments of the country.

Mr. Newell constructed what he termed his Permutating Lock, which was composed of a







series of first and secondary tumblers, the secondary series being operated upon by the first series. The first step taken to make a secure lock, was to add a series of complicated wards to the locks; but it will be readily seen, that what can be reached with a key, could be reached by some other instrument; and although it required an instrument of a different form, yet the operation was just as certain and fatal to the security of the lock.

The Parautoptic Lock was then invented by Mr. Newell, retaining all that was deemed good in the locks previously made, and, at the same time, guarding against all the defects proved by actual experiment.

And now we must call attention to Pye's Patent Reverse Acting Ratchet Tumbler Padlocks, herewith illustrated. The large cut represents a machine made Scandinavian Lock; case, cap and shackle made of maleable iron. The shackle is made with a shoulder, a great improvement over the old kind, as it prevents the cap from being driven off, and also prevents the rain from running into the lock. Thes locks are made in five sizes.

As seen in the small cut, the key is placed in the centre of the tumblers and moves, some in one direction and others in the opposite direction; the stud in the compound tumbler in the pad lock passing into the reverse acting tumblers, which allows the circular bolt to be released from the shackle.

These locks are made without a groove or shoulder in them, and are considered the best lock ever made; they will not get out of order, and dirt does not prevent them working; they never have been picked, nor can they be.

Door locks and catches are also manufactured. In these the stud in the bolt moves directly into the reverse acting tumblers.

All drops are made of brass.

Further information can be had on application to J. H. McWilliams, sole manufacturer No. 32 Platt street, N. Y.

Dr. Andrews has announced a discovery of the first importance, namely; that the gaseous and liquid state of matter are continuous. His experiments have chiefly been made upon carbonic acid, confined in fine glass tubes, and subjected to various pressures up to that of 110 atmospheres; they show that from carbonic acid as a perfect gas to carbonic acid as a perfect liquid the transition may be accomplished as a continuous process, and that the gas and liquid are only distinct stages of a long series of continuous physical changes.

The Louisville Gas Works.

The President and Cashier of the Louisville Gas Company, one of our most important institutions, have submitted to Mayor Bunce reports showing the operations of the campany for the past year, and its present condition financially and otherwise. We have been permitted to reproduce portions of these valuable reports. The President, Prof. J. Lawrence Smith, says:

During the past year we have been closing up the affairs of the old company after a duration of thirty years, and are able to congratulate the city and private stockholders that the affairs of the company have been conducted by the various administrations to the satisfaction of all parties concerned. The city, besides having been but lightly taxed for her public lights during that term, is now enjoying the benefit that no other city in this country has, that of being lighted without any draft on her revenue from taxes. Her accrued interest in the Gas Works from a loan of her credit at the commencement of the gas enterprise thirty years ago, and the trust fund accruing from said credit, being carefully guarded and invested every six months, now furnishing a fund from the interest of which the city can be lighted without any or but with a small cost for many years to come. We are now at the close of the first year of the operations of the Louisville Gas Company, organized on the basis of the new charter, which is to continue in effect for twenty years. During the past year there has been done a great deal of work with reference to the permanent enlargement of the works. Among them are the completion of the extension to Portland and construction of the new gas-holder on Portland avenue. The gas was let on the Portland avenue July 1, 1869, at which time the city was credited with stock for the said extension according to the basis agreed upon between the city and gas company, when it was made out of their fund in trust, making the entire interest of the city of Louisville in the Gas Company twelve thousand and eighty-two shares of fifty dollars each, the number of shares owned by private consumers being eleven thousand seven hundred and twenty-one shares.

The other important extensions made by the company were, first, the construction of a large coal shed on the premises of the gas works, corner of Jackson and Washington streets, erection of buildings for the placing of our mills, etc., for making clay retorts, fire tiles, etc. The fire tiles we have been making for several years with great advantage to the company, and as soon as possible, we propose to commence making our retorts, which will be a matter of considerable economy to the company. It has been also necessary to have a large steam engine and an additional boiler. The engine has been in use for some time, and the new boiler is now in course of erection. On the premises on Green street there has been erected a three-story building for the inspector's department, and is complete in all its arrangements The office has been entirely refitted, and the upper portion of the same so arranged to give an additional room for office purposes and make the family rooms of the inspector more comfortable than they have been. All the above additions were very necessary, and, as constructed, are good and permanent improvements. We contemplate next year besides making the ordinary extensions required by the growth of the city, commencing operations for making a larger gas-holder on the premises on Washington street, so as to have holder capacity for a little more than the largest demand of the city for any day during the present year. The new coal shed will also be completed, and have the following dimensions: 40 feet in hight from bottom of excavation, 80 feet wide and 200 feet long, with a capacity of about 400,000 bushels. That part of the enlargement to be done this year will not require any great outlay, and when completed will add much to the economical production of gas.

THE COMPANY'S FINANCES.

From the semi-annual statement of the cashier, Garnet D Marshall, Esq., we obtain the following financial summary:

FACE OF LEDGER, JANUARY 1, 1870.

Cash		$11,405 37
Gas Works	$413,315 13	
Street Mains	484 971 89	
Services	56,126 30	
Street lamps	61,296 69	
Meters	55,524 42	
Real estate for gas works	88,000 00	
Real estate for office & shop	37,560 25—1,196,795 68	
Gas fittings		5,934 65
Unpaid gas-fitting bills		434 80
Coal		15,671 88
Lime		2418 34
Unpaid gas bills		60,130 00
Gas bills		2,078 70
Fire tile and fire bricks		2,589 48
Unpaid coke bills		1,708 80
City of Louisville		28,418 52
Improvements on gas works		13,087 94
City of Lo'ville fund in trust		35,000 00
		$1,375,672 11
Bills payable		1,146 66
Capital stock—		
City of Louisville	$604,101 00	
Individuals	585,950 00—1,190,050 00	
Profit and loss		81,211 63
U. S. excise tax		3,581 40
Louisville Gas Co. No. 1		21,055 90
Depositors		12,220 00
Dividend No. 1		47 50
Louisville city interest and dividend account		66,359 02
		$1,375,672 11

PRODUCT AND EXPENSE OF MANUFACTURE.

Total product of manufacture of gas, coke and tar	$373,719 27
Totel expense of same	215,071 41
Net product	$158,647 56

OTHER STATISTICS.

Gas manufactured to July 1st, 1869, cubic feet	70,892,200
Gas manufactured to Dec. 31, 1869, cubic feet	76,392,000
Total	147,284,200
Gas sold per meter to July 1st, 1869, cubic feet	52,109,200
Gas sold per meter to Dec. 31, 1869, cubic feet	52,198,500
Total	104,307,700
Street lamps in use July 1st, 1869	1,600
Street lamps in use Dec. 31, 1869	1,712
Increase	112
Pipe laid to July 1st, 1869, feet	350,408
Pipe laid to Dec. 31, 1869, feet	362,503
Increase	12,095

This is equal to sixty-eight miles and 3,463 feet of pipe. In size the pipe laid is from two to twelve inches.—*Louisville Commercial, March*

Peoria Gas Works.

THE WORKS REBUILT AND REPAIRED.

These works were originally built many years since by Thomas Pratt & Co., of St. Louis, and the machinery then used was from the original gas works of Chicago. The capacity of the works then was what is known as six inch works, or 50,000 cubic feet per diem. The works have been rebuilt and repaired until they are now what is known as ten-inch works, with a capacity of about 300,000 cubic feet per diem. The works were remodeled by J. C. Westwood then of the Cincinnati gas works. They are owned by an incorporated company, and are valued at about $150,000.

The works include a number of buildings, viz., two retort houses, the old one 84x20, and the new one, 84x32; a condensing room 10x28; engine and boiler room 22x34; lime house 16x29; purifying house 29x35; two gas holders, one 63 feet in diameter and 22 feet high, and the other 26x84: and a meter house 29x59.

The new retort house, which is now used as a coal house, will hold seven benches of five retorts each, and when in full work, will increase the capacity to 300,000 cubic feet per diem. The old retort house has been changed to suit clay retorts, instead of iron ones, which has increased the capacity 50 per cent, because the fire clay will admit of a greater heat than iron. All the balance of the new apparatus is made to suit the new improvements. There are eight benches, of three retorts each, in the old retort house. The apparatus in the condensing room consists of two wrought iron washers, 18 feet long; one cast iron cooler, 18 feet deep, and an 8-inch condenser.

The engine and boiler room contains two boilers, 18 feet in length, made by Shields & Co. of this city. There are two engines, one of them a ten horse power; a double acting engine is used for the exhauster. The other is a small engine, furnished by Frazer, Thompson & Co., and is used for filling the tanks and driving the force pump. This room also contains the exhauster, which has a capacity of 300,000 feet, and was manufactured by Smith, Sayre & Co. of New York.

The lime house has a capacity of from 500 to 600 bushels of lime, which is brought from Logansport, Ind. The purifying house contains four cast iron purifiers, made by Morris, Tasker & Co. of Philadelphia, and has a capacity of 300,000 feet. They are each 14x10 feet in size, and 30 inches deep. There are also three tiers of wooden trays

The meter house contains a new meter, manufactured by the American Meter Company of Philadelphia, and has a capacity of 300,000 feet. This room, as all others, is heated by the escape steam from the boilers. All the gas is measured here before being stored away for sue.

There are two gas holders, one has a capacity of 65,000 cubic feet, and the other of 125,000, or a total capacity of 190,000 feet. The old one was built by Thomas Pratt of St. Louis, and the other, constructed last year, by Stacey & Co of Cincinnati.

The company were obliged to remodel the whole works last year. They are now using about 1000 tons of Pittsburg coal, besides the Jones prairie coal. The company furnish gas to the city for street lamps, for about $2 per 1000 feet. We are informed that the following are the prices paid at the several places named: St. Louis, $4 25; Chicago, $3.75; Quincy, $4.25; Freeport, $5; Bloomington, $4; Rockford, $4.50, and Chicago paid $2.75 per 1000 feet for her street lamps, and erected and took care of the lamps. In New York the company got $55 per year for each lamp post. But we are further informed that there is no city in the United States, with the exception of Springfield, Illinois, and Pittsburg, where the street lamps are furnished as cheap as in this place.

The Peoria company sell about 300 barrels of tar per year, and have a tar well 8½ feet in diameter by 16 feet deep. A new one, 14x18 feet, is to be constructed, with a capacity of 700 barrels.

All the late improvements have been made within the last two years. The work and material are nearly all fruits of home industry. The tanks were put in at a cost of $4,000 by P. Delehanty; the brick work by Hazzard & Son; carpenter work by Eckley & McKenzie; tin work by Lloyd & Son; engines built by Frazer, Thompson & Co.; plans for the building drawn by C. Ulricson; the roof and other iron work by A. Younger, and the castings by Nicol, Burr & Co.

The works now consume about 7,000 bushels of coal per month, and manufacture about 2,500,000 feet of gas in that time. About 260 bushels of lime are used and about 15 men are constantly employed. The works are under the superintendency of Mr. J. C. Westwood, a gentleman who has had many years experience in the business, and has shown himself in every way efficient and capable.—*Peoria Daily Transcript, March 26.*

The Suez Canal—Opinion of a Leading Engineer.

The following is an extract from a private letter recently written by a leading American engineer at Port Said His views regarding the success and capacity of the canal are entitled to serious consideration:

"I have just passed over the great Suez Canal. We left Suez yesterday morning after passing a day there. I cannot say the canal commercially is a success. Financially, so far as the present stockholders are concerned, it cannot be. It has cost in cash four hundred million francs (eighty million dollars), which, for one hundred miles of canal is too large a sum to pay dividends upon. If the company charge a very high rate for vessels passing through, it would deter many from coming this way. Only light freights could afford it, and that would furnish but small tonnage. Cotton from India is the great bulk of the return traffic, which continue to go round the Cape of Good Hope. The canal will become the joint property of all the governments interested in the trade that would pass through it, they paying the stockholders a fair price for the canal, and thereafter make it a pubic highway, charging only sufficient tolls to keep it in good working condition, which I am pleased to find will require very much less than has been represented. I thought the drifting sand would continue to fill up the canal. This is not the case. The entire canal, or very nearly so, is excavated below the level of the country on either side, hence the embankments are very wide and high, and serve as a protection against the drifting sand, as well as a bulwark strong enough to prevent breaches in the embankments. The harbors at either end are admirably constructed for the accommodation of the immense business the canal is destined to do. The water is at present twenty-two feet throughout and will soon be twenty-five, with a width of 1,500 feet, and more in many places. There is not a lock of any description on the canal, from the Mediteranean to the Red Sea, or Gulf of Suez. There is no obstruction of any kind. The water of the two seas is about the same height—the tides affecting the canal only for the distance of a few miles at either end. I repeat that, in my judgment, as a canal and railroad man, this canal is a great success, and will mark an era in the history of the world. I regret our government did not order one or more vessels of war to represent us here. All other nations were thus represented at the opening. We had some fine ships very near here."

The Extraction of Ammonia from Gas, and Utilization of the Product.

It is our greatest pleasure to be able to place before our readers, especially the gas fraternity, any new inventions or improvements relating to the manufacture of gas, etc. With this object in view we herewith illustrate an apparatus for the extraction of ammonia from gas, and the utilization of the products, which we take from the "*British and Foreign Mechanic and Scientific Instructor*," of February 12, 1870. The Editor of the above-named journal having received a host of queries respecting Anderson's and Howes' surface gas washer, scrubber, and sulphate of ammonia apparatus, delayed to answer until he obtained a copy of a paper with some of the illustrations, which was read before the British Association of Gas Managers. The paper was by Mr. George Anderson, of London, and is as follows:

If ammonia exists in any considerable quantity—that is to say, if nothing beyond the condenser and the lime or other purifier for the extraction of sulphur is employed, even if the ordinary scrubber is added, which merely consists of a vessel filled with some rough material that is only removed at distant and uncertain intervals, perhaps getting a flush of water occasionally, but under no systematic arrangement—the gas will contain such an amount of ammonia as will lessen its illuminating power, and will act to the destruction of brass fittings; will quickly destroy several important parts of the meters, and this destruction causes leakages and offensive odors, and consequently tends to earn a bad character for gas, which hinders its introduction, besides giving the gas company a very considerable amount of trouble in making good the every-day defects which occur.

In provincial works, more especially in the smaller towns, the extract of ammonia is not attended to as the extraction of sulphur is.

Numerous gas companies find their ammoniacal liquor a nuisance, and the respective communities they supply are universally getting more sensitive in the nose, so that unless it can be sold or given away, the question of what is to be done with it is becoming every day most urgent.

As respects the best mode of removing ammonia, some manufacturers employ acid and convert the ammonia at once into a solution; it may be of sulphate or muriate of ammonia.

In large works these methods have answered commercially, but in small works they will not pay, and therefore they are not the best means under the circumstances.

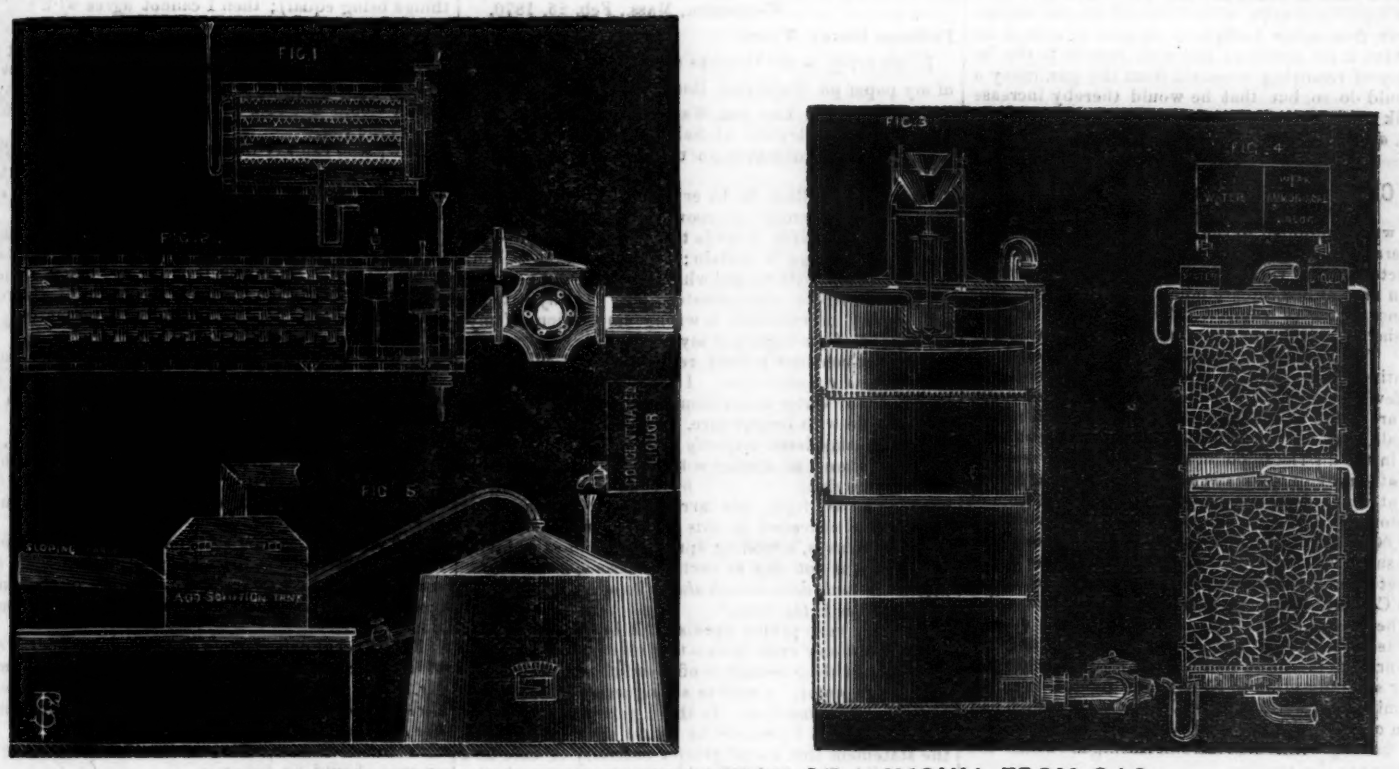
Much interest has attached of late to the quantity of sulphur which in some works escapes the ordinary means of purification, and of the bearing which the action of ammonia has in reducing that amount of sulphur, so that any mode which extracts the ammonia, but retains the sulphur, might be a very questionable operation.

I will now describe the means which I employ, and which I may designate as Lowe's process, with some adaptations of my own. After the first process of condensation, made very gradual by running a condensing pipe first along the inside and then along the outside of the retort house, the gas passes to the ordinary condenser, and thence to the washer. This washer (fig. 1 is a vertical, and fig. 2 a longitudinal section) consists of an oblong vessel with several false bottoms or trays, each containing a few inches in depth of ammoniacal liquor. Cross partitions with serrated edges dip into the liquor in each tray, so that the gas in passing is divided into small globules, so as to present great surface of contact with the liquor. Means are provided, by small connecting pipes fixed on the the sides externally, to regulate the amount of pressure to be given by each tray, and to keep this uniform while the amount of gas passing is continually varying. The stream of ammoniacal liquor is supplied at the top, passes from tray to tray, and escapes at the bottom; the gas, on the contrary, passes from bottom to top.

I have tested the gas for ammonia in its various stages, through the apparatus, by ascertaining how many feet of it was necessary or required to saturate a given quantity of sulphuric acid. In each experiment the test was the same, viz., 49 grains of sulphuric acid, made into a solution with distilled water, reddened with litmus, placed in a Woolfe bottle charged with small pebbles, and the gas allowed to bubble through at the rate of not more than one cubic foot per hour, until the liquid assumed the well-known tint of saturation by ammonia; a piece of reddened litmus paper being also inserted in the outlet to prevent ammonia escaping unobserved.

The number of feet of gas necessary to saturate the above quantity of acid was as follows: inlet of washer 12·5; outlet of first tray, 15·5; ditto second tray, 25·0; ditto third tray, 23.0. Here the gas enters the scrubber. Outlet of the scrubber when charged with 3 oz. ammoniacal liquor, 8·0: ditto, when charged with pure water, 73.0.

The gas was next tested by the photometer, by burning the gas of the inlet of the scrubber against the gas of its outlet simultaneously at opposite ends of the bar



MACHINERY USED FOR THE EXTRACTION OF AMMONIA FROM GAS.

From this washer the gas passes to a vertical scrubber. This scrubber is constructed as most modern scrubbers are, and contains several barred open trays, but their construction is somewhat novel, the object being to prevent the water, which had been equally spread at the top, ever collecting in a body, and descending by one channel, while the gas may be ascending by another and an easier one where there is less water. As these trays are constructed it is impossible for the water to descend but where I have designed it shall do, and therefore in the depth of this tall column, we have, as often as we choose to place them, a self-acting never failing distribution of the purifying material. This scrubber, I supply with ammoniacal liquor, or with pure water, and when using ordinary Newcastle coal, I prefer pure water in the the quantity of 8 to 12 gallons for every ton of coal being carbonized. The mode of supplying water is by a Barker mill, first proposed, I believe, and employed by Mr. George Lowe, at the chartered Gas Works, about the year 1812.

Mr. Lowe employed two Barker mills (see figs. 3 and 4—Anderson's scrubber and Lowe's washer), one at the top for the pure water, and one in the middle for the ammoniacal liquor. This, at that time, was I think, the best apraratus that could be employed, as exhausters were scarcely known and certainly not used, and therefore as washers throw a considerable pressure on the retorts, were certainly objectionable.

It is impossible to economically supply such a stream of water as will keep a Barker mill constantly revolving, without so diluting the liquor as would render it useless for conversion into salts; besides I have doubts of the advisability of such a stream of water being brought into contact with the gas. I, therefore, apply a tilting apparatus, which is fed at any desired rate by means of a tap, and by emptying its contents instantly causes the mill to revolve till the charge is distributed; this tilting I prefer to occur every 10 to 15 minutes, according to the quantity of gas passing.

and to check the experiments the test-meters and burners were removed. In each case, whether when using ammoniacal liquor or water in the scrubber, the gas of the outlet was superior to that of the inlet, in the proportion of about 5·5 to 7·2; that from the pure water being quite as good as that from the liquor, so that the use of water to the extent named did not seem to injure the illuminating power, I may here mention that with the scrubber in action, in addition to the washer, the lime in the purifier lasts very much longer, and when taken out has much less odor.

The test for bisulphate of carbon was made after a method described in the *Chemical News*, because it can be made in a few hours, and solely on that account was employed instead of the more elaborate, but more tedious, method of Dr. Letheby. By this mode the gas is caused to bubble through a solution formed of 5 drops of acetate of lead and 60 drops of ammonized alcohol, until the solution assumes an orange color, and a dark brown precipitate is formed.

When the gas was being used by ammoniacal liquor in the scrubber, of the strength of two ounces, the solution changed color when 1.5 foot had passed through, and when pure water was substituted for liquor it did not change color until 4 feet had been passed.

I will now describe the apparatus for converting the ammoniacal liquor into sulphate. (See fig. 5.)

By the aid of a pump worked by the steam-engine the concentrated liquor is raised and delivered into a tank sufficiently high to run from it into a still, below which fire is applied, and the ammonia passes off through the still-head into a lead pipe laid horizontally in a lead lined tank containing some acid solution.

The salts form in the bottom of this vessel, and are fished out and laid on a sloping table to drip, from whence they are taken to store. When the liquor has been boiled down to about ¼-ounce strength, it is run into a tank, the bottom of which is a foot or two above

the retort ash-pans, and from this tank a pipe is laid with taps and branches—one to each ash pan.

During the boiling process a considerable quantity of steam comes over with the ammonia, and it is important that the said tank be constructed within a few feet of the still, otherwise the steam will condense and form water, and prevent the formation of salts; and therefore, to get rid of this steam, we enclose the tank with conveniently hinged doors to open when removing the salts; and from the top of the wood covering passes a pipe communicating with one of the flues leading to the chimney.

By the foregoing arrangements no vapor escapes, so that any one standing ten feet from the apparatus would be unable from the smell to detect what operation was being carried on. I do not hold out the process of manufacturing salts of ammonia as a profitable one for companies who can sell their liquor at, say, two shillings per 100 gallons, neither do I wish it to be understood as one that will entail a loss. The process will, in most cases, be self-supporting, while in works making 20 million feet of gas per annum and upwards there will be a profit.

In some cases it would pay the gas company to convert its liquor into salts, while it would not pay a manufacturer five miles distant to remove it, even if he could have it for nothing; and with respect to the desirability of removing ammonia from the gas, many a one would do so, but that he would thereby increase the bulk of his liquor, which is already an incumbrance. —*Brit. and Foreign Mechanic and Scientific Journal.*

Prof. Chandler on the Purity of Croton Water.

The water supplied to the citizens of New York, at the liberal rate of sixty-five gallons to each person daily, is collected by the various branches of the Croton river from an area of 338 square miles in Westchester, Putnam, and Dutchess counties. The character of this water shed is a sufficient guaranty of the purity of the water. The surface of silicious gravel rests on hard Laurentian gneiss, and is open pasture or woodland, with few swamps. No factories line the streams, which are liable to contaminate the water with refuse chemicals, and no towns or large villages exist anywhere in the district to pollute the waters with sewage. A recent survey of the water-shed has indicated fifteen points at which dams can be erected for the creation of large storage reservoirs, whose joint capacity would be 67,000,000,000 gallons, or a supply, at the present rate of consumption, for 1,000 days. One of these dams, 650 feet long, is now in process of construction at Boyd's Corner, in Putnam county, twenty-three miles from the mouth of the aqueduct. When this dam is completed it will flood an area of 303 acres, and the reservoir thus produced will contain 3,369,206,857 gallons, or a supply of 50 to 55 days of drought.

Examinations were made of Croton water which had been in contact with lead for different lengths of time, under usually occurring circumstances, of which the following are the results:

1. A gallon of Croton water from a lead-lined cistern, in which it had stood for several weeks, was found to contain 0·06 grain of metallic lead.

2. A gallon of water which had remained six hours in the lead pipes of the chemist's residence, yielded 0·11 grains metallic lead, a considerable portion of which was visible to the eye, in the form of minute white spangles of the hydrated oxycarbonate ($PbO, H_2O + PbO, CO_2$).

3. Water drawn from one of the hydrants of the School of Mines Laboratory, in the middle of the day, when the water was in constant motion, yielded traces of lead. This water reaches the school through about 100 to 150 feet of lead pipe.

These results indicate the source of many hitherto unaccountable cases of lead poisoning, and are of a character to alarm the residents of New York, and to lead them to adopt precautionary measures for protection against this insidious cause of disease.

Many have already introduced as a substitute for lead pipe the "tin lined" or "lead-encased block tin" pipe.—*Scientific American.*

The Internal Revenue Bureau has directed that after May 1st, 1870, all adhesive stamps used upon instruments, documents, writings and papers, mentioned in Schedule B. of the Internal Revenue Laws, shall be cancelled by the person affixing, either by writing upon each and every stamp, in ink, the initials of his name, and the date, year, month and day upon which the same is attached or used, or by cutting or cancelling the same by a certain machine approved by the Commissioner. This regulation has been made on account of the extensive frauds alleged to have been committed by washing, restoring and using adhesive internal revenue stamps which have been cancelled by the "stamp ribbon machine." The commissioner orders that after May 1st, 1870, no other method of cancellation than that first mentioned above, shall be recognized as legal or sufficient.

Chemical Repertory.--No. 29.

MAY 2, 1870.

Editor—HENRY WURTZ.

[*Original Communication.*]

THE LIGHTNING-ROD CONTROVERSY.

[DR. BUSHEE IN REPLY TO DR. VAN DER WEYDE.]

[The following interesting communication from Dr. BUSHEE was of unexpected length, and attempts were made to condense it into limits adapted to its presentation as a whole, in the present issue; but this being found impossible without injurious omissions, it was judged best to divide it; though we fully appreciate the objections to such division of controversial articles, as a general thing. Even now presented it is considerably abbreviated from the original.—H. W.]

WORCESTER, MASS., Feb. 25, 1870.

Professor HENRY WURTZ:

In his reply to the remarks appended to an abstract of my paper on Lightning Rods, in the REPERTORY of January 3rd, Dr. VAN DER WEYDE reiterates the substance of his statement at Salem, viz., that I "called a spring or well of water an unsafe mode of connection."

Now, I am willing to be criticised fairly and to be set right when wrong; moreover, I do not believe that Dr. VAN DER WEYDE intends to misrepresent me—but one of two things is certain; either I *said*, at Salem, what I did not believe and what my paper did not contain, or the Doctor misunderstood me. At any rate he still seems to entertain a wrong impression of my views, and of the import of my paper.

I do not consider myself responsible for such doctrine or its consequences. I have never entertained the idea that water connection could not be made safe and reliable with proper care. I simply affirm that it cannot be considered *perfectly safe*, to run a lightning-rod into a well or spring with metallic water pipes leading into the house, since for some reason, accidents have occurred from this arrangement. In fact, the Doctor has conceded in this point even, nearly all I claim. He says, a well or spring is the most reliable, provided it is not dry at certain seasons, *and the connection is made deep enough always to offer sufficient metallic surface to the water.*"

This is a very proper proviso. It implies that caution is necessary even here—that unless "the connection is made deep enough to offer sufficient metallic surface to the water," a well or spring *would not be* a safe and reliable connection. In this I perfectly agree with the Doctor, and I presume he would agree with me in the statement that a still greater necessity of care and caution is demanded in making connections with the ground so as to present "sufficient metallic surface" to the moist earth, to insure perfect safety.

But here lies the trouble. People do not take sufficient pains to secure this end. The very point for which I am contending is a more thorough *ground connection.*

From carelessness, ignorance, a false economy, or some other cause, it seems to me there is, in this country a very general and deplorable neglect in this respect, and hence numerous casualties. To meet this I recommend, whenever available, the use of gas and water pipes.

Dr. VAN DER WEYDE, however, dissents from this plan, and while he finds but little to say against water pipes as a connection, he has many objections to gas pipes. He says "*gas pipes are only connected with the ground by intervention of the meter, always made of thin metal, and easily destroyed or injured by lightning; besides, the joints are often made by sealing wax. Then, as a rule, many parts do not contain metal enough to convey heavy charges.*"

If gas pipes are but slightly connected with the ground, and are too slender to convey a heavy charge, etc., I would by no means recommend them as a proper connection. The gas pipes of our city (Worcester) and of other cities in New England, are of substantial thickness, with ample capacity to convey any charge the rod may transmit to them, and are well buried in the earth, or at least sufficiently to form a very extended ground contact. If any examples could be adduced to prove that accidents have actually occurred under such circumstances, the case would then be very different.

A leyden jar or battery may be discharged by grasping the metallic rod of the dischorger, without any sensible shock. In this case the charge is instantaneous and explosive, yet no perceptible portion of it leaves the direct line of communication for poorer conductors. Still less have we to apprehend such a result when the charge is conveyed gradually through the agency of points. A person may receive through his system, in a few seconds, the whole contents of a heavily charged battery, without the least sensation, by slowly approaching the point of a pin held between the thumb and finger, to the knob of one of the jars, while the other hand is connected with the outside coating.

Whatever has been said in relation to gas pipes will apply still more forcibly to water pipes, since these are usually more deeply set in the ground, and present a much more extended metallic contact to the earth. Yet even water pipes, Dr. VAN DER WEYDE thinks, "do *not afford the safety* of a system of rods well connected with a good spring or well, which geologically cannot be so situated as to "offer any considerable resistance to conduction of electricity"; while such pipes really afford a conducting medium equal to the rod itself, and far superior to water or moist earth, and present, perhaps, a thousand times more surface contact to "*water*" and the moist ground, than 'metallic plates" or lightning rods, run into wells or springs in the usual way.

As to the geological situation of wells and springs. If he intends to claim that they cannot be so situated, geologically, as to offer *any resistance* to electricity; that wells, springs and moist earth conduct electricity with precisely thesame freedom, in all localities (other things being equal); then I cannot agree with him.

I believe he admits that a cistern does not afford a safe connection, on account of the poor conducting material with which it is surrounded. I presume he would allow also, that a pool of water in the cavity of a rock would not be a suitable place for the termination of the rod.

Now, who can say there cannot be *natural cisterns* surrounded by beds of clay, and of such limited extent, as to offer notable resistance to conduction of electricity.

Who can say a well or spring cannot be so situated in a ledge of rocks, as to offer more or less resistance to electricity? Such a well or spring being supplied merely by percolation through the seams of the rock; while this supply may be partially, if not entirely cut off for a time, and yet the well not "*dry.*"

A well or spring so situated, like an artificial cistern, is partially isolated from the general springs and subterranean streams which afford a free and ample medium of conduction.

It is well known that different rocks and soils, and different geological strata, conduct electricity with different degrees of facility; some marbles, for instance, are comparatively good, whilst others are poor conductors.

The effects of geological conditions on the conductivity of different localities are well indicated by measuring the relative degrees of resistance offered on different telegraphic lines, with the some ground connections.

From recent experiments on telegraphic lines in some of the rocky and mountainous districts of Vermont, Mr. MOSES G. FARMER found the resistance for two or three miles equal to the usual resistance on a line of *five hundred miles.*

In such a section, where such resistance exists, greater care should be taken in the ground termination. When the connections are made so thoroughly as to remove all notable resistance to electricity (in whatever way effected, whether through moist earth with metallic plates, or by a well or spring), the rod is then and not till then in a reliable condition, which can only be determined by actual experiment in each particular locality; and no agent or constructor who has not the requisite knowledge and means of doing this should receive the confidence and patronage of the public.

If, in the "lowlands of Holland," where the ground is completely saturated with water, three long prongs driven into the moist earth "have never failed" (and I have not the least doubt of the fact), it does not follow that the same arrangement would prove equally safe and successful in our rocky New England. What may be perfectly reliable for one locality, may not answer for another.

[To be continued.]

[*Original Communication.*]

ANSWER OF PROF. VAN DER WEYDE TO PROF. WALLING'S SECOND REJOINDER.

[*Continued from page* 117.]

If Prof. WALLING has given to me, and as I suspect to many others, the impression that he was fighting against the theory of the Conservation of Force, it is his own fault. In the extract from his paper, appearing p. 82 of this Journal (REPERTORY, No. 14, Sept. 16, 1869) and sanctioned by the Prof. himself, he says, "every physical phenomenon indicates beyond a doubt that the total energy of the Universe instead of being constant is essentially variable." Now the fundamental principle of the conservation theory is exactly the reverse, namely, *that the total energy*, that is the sum of all forces in the universe, *is a quantity as constant as the quantity of matter*, and that it is as impossible to destroy or create force, as to destroy or create an atom of matter. How-

ever, I see now from the last answer, that the new doctrine of the Conservation of Force is admitted I wondered already that the much older man of the two, should be called on to defend the newest doctrine against the younger man; however I rejoice that in this point at least we agree.

What I called an "old notion" is the definition of force as that "*which is being associated with matter causes motion*, etc This definition or its equivalent is found in a great number of old mechanical text books (see, for instance, MOSELEY): it includes the presupposition of the existence of force as an independent entity, distinct from matter, and which may *become associated with matter*; this being the theory advanced by Prof WALLING, and rejected by me, it remains the only question at issue. Prof. W. now asserts that this is the only way in which it is possible to maintain the conservation theory; I assert that when considering gravitation as an agent inseparable from matter, the conservation theory can be maintained, and other phenomena also explained in a simple manner, without recourse to the trancendentalism of imagining a force separated from matter.

What necessity is there to consider that if a weight is lifted up, and there suspended, a portion of the gravitation (which will cause it to redescend when permitted) is dissociated from matter and restored "to its independent condition in space," to be reassociated again with matter at the moment the weight drops; according to this idea, when I wind up my watch or clock I dissociate force from matter, and bring it in its independent condition, to be gradually reassociated again with the spring or weight, during the twenty-four hours or days that the watch or clock takes to run down; after this idea, when I give oats to my horse, who digests them and so obtains muscular energy, I, or rather the horse, dissociates force from matter, to be reassociated again in his muscles, when he is set at work; when I put coal under my steam boiler to be consumed, and so obtain steam pressure, force must be dissociated from matter, to be associated again with the steam at every stroke of the piston! etc.

Now I disclaim all this continual dissociation and association, and maintain that in the elasticity of the spring the original force is retained and stored up, and manifests itself at every opportunity; that the energy of the oats digested by the horse, is stored up in his muscles and nerves; that the caloric obtained by the combustion of the coal is stored up in the form of latent force in the pressure of the steam, inseparably associated with the same, and by no means dissociated, to be reassociated again; and that for the same reason when the pendulum has been lifted up to its greatest height, the force which accomplished this needs not to be considered as dissociated and "returned to its independent condition in space" to become associated again when the pendulum descends, but that it is stored up in the raised weight of the pendulum—in short, that every raised weight contains a force stored up; which may be conserved *for the future*.

With this last expression Prof WALLING finds fault, and tries to make out that with it I "fight the conservation theory;" because, says he: "a conservation which depends for its maintenance upon restorations of its losses by accessions to be received in the future, is no conservation at all. As well might a speculator or gambler, who alternately loses and gains in his operations, argue that his wealth remains unchanged, because his losses of to-day will be made up by his gains to morrow."

Now it appears to me that Prof. W. has, by this comparison, brought out a very strong argument against his own theory and in favor of mine. He maintains a dissociation of force from matter, and therefore believes in "*accessions to be received from beyond in the future*"; thus his theory exactly fits the gambler, who dissociates his money from his pockets "to-day, to be reassociated again in the future, to morrow"; my theory does not believe at all in "accessions to be received in the future," but in storing up my theory does not compare with the idea of a gambler, but with that of a man who stores up his money in his safe, or bank, to draw on when wanted. So I maintain that the force of steam is stored up, just as is its 1000 units of latent heat. If the latter does not manifest itself on the thermometer, has it therefore ceased to exist? or is it dissociated to its independent condition in space? Heat being a form of motion, a force, the difference between sensible and latent heat is that the molecular motion of the first is communicable to the thermometer, while the latent heat is that peculiar molecular vortex motion, required to keep a body in the gaseous or liquid condition, which motion Prof. W. himself has made a subject of extensive study and speculation. This peculiar motion (latent heat), which causes a body to be liquid or gaseous, is not communicable except when driven out, that is, when by condensation or otherwise, the space required by the molecule in keeping it up, is contracted or sufficiently diminished. Even latent heat being thus a motion of matter, a store of force, a motion of material molecules ready to show itself undiminished at any time, heat cannot be asserted ever to become dissociated from matter. As further all mass motion is convertible into molecular motion (heat), and as in the essence of the true modern conception they are not only convertible, but, in a certain sense, identical forces, we cannot dissociate force from matter, without screwing up our imaginations to a high metaphysical tension.

If force is considered as something independent from matter, heat should also be an independent entity. As, however, heat shows itself at any moment, even latent heat appearing by condensation, then its actual continued existence cannot therefore be denied; we must conclude the same for force generally. The force in a weight raised; in a spring wound up; in compressed air, etc., has not ceased to exist; it is like a treasure in a bank or safe, it is ready to show its existence any moment when required; and the assumption of dissociation throws unnecessary obscurity over a subject which lies at the basis of mechanical science.

[To be concluded.]

American Chemical News.

FARMER'S THEOREM.

[Mr. FARMER'S new mode of reducing photometric results, for comparison, in testing his theorem, by the use of *fractional powers*, as in his second paper in the REPERTORY No. 27, issue of April 2, 1870 (presented in corrected form in our last issue); having excited some curiosity and inquiry, that gentleman was requested by me to kindly demonstrate for me his method of calculating these reductions. This very simple demonstration I deem quite interesting and useful enough to occupy a portion of our space.—H. W.]

TO FIND THE POWER OR EXPONENT.

Let a — The smaller consumption of gas.
b — " greater.
c — " candle power of the smaller consumption.
d — " " " " greater "
n — " power or exponent required.
Given; $a^n : c :: b^n : d$ to find the value of n.]

Therefore— $$c\,b^n = d\,a^n$$

And— $$\frac{b^n}{a^n} = \frac{d}{c}$$

Whence— $$n \log.\frac{b}{a} = \log.\frac{d}{c}$$

And— $$n = \frac{\log.\frac{d}{c}}{\log.\frac{b}{a}}$$

Or $$\log. n = \log.\text{ of }\log.\frac{d}{c} - \log.\text{ of }\log.\frac{b}{a}$$

EXAMPLE.

Given; $4^n : 10 :: 5^n : 15$ to find the value of n.

Per formula— $$\log. n = \log.\text{ of }\log.\frac{15}{10} - \log.\text{ of }\log.\frac{5}{4}$$
$$= \log.\text{ of }\log. 1.5 - \log.\text{ of }\log. 1.25$$

Log. of log. 1.5 —	1. 245737
Log. of log 1.25 —	1. 986368
Log. n —	0. 259369

Therefore; n — 1.817, the power or exponent required.

To find the candle-power for five cubic feet consumption, when the power or exponent, the smaller consumption, and its illuminating power, are given.

Let y — the candle power required.

Given; $a^{1.5} : c :: b^{1.5} : y.$

$$y\,a^{1.5} = c\,b^{1.5}$$

$$y = \frac{c\,b^{1.5}}{a^{1.5}}$$

Or; $\log. y = \log. c + 1.5 \times \log. b - 1.5 \times \log. a.$

EXAMPLE.

Given: $4.^{1.5} : 10 :: 5^{1.5} : y.$

Log 10 —	1. 000000
Log. 5 × 1.5 —	1. 048455
	2. 048455
Log. 4 × 1.5 —	.903090
Log. y —	1. 145365

Therefore; y — 13.97 candles.

WILLIAM FARMER.

MANHATTAN GAS WORKS,
18th Street Station, April 20, 1870.

Correspondence.

[Correspondents in all cases should sign their communications with their names and address in full, not necessarily for publication, but as a guarantee of good faith.—EDS.]

The Trials and Vexations Experienced by a Gas Engineer in a Foreign Country—He Becomes Disgusted with the State of Things and Returns Home—A Warning to the Profession.

NEW YORK, March 23, 1870.

Messrs Editors: Frequently seeing correspondence in your valuable paper from engineers and superintendents, giving their experience, I have thought it might interest some of your readers to know of a few of the trials and vexations experienced by an engineer in a foreign country, and enclose you the following. If you think they are worth publishing they are at your disposal; if not, consign them to the waste-basket.

Early in the month of September, 1868, I was engaged by a firm in this city to go to the city of Mexico, as engineer of the gas works. I could learn but little of the works, only that they had been contracted for as long ago as 1861, consequently were supposed to be finished and running, and that the house in whose employ I would be in Mexico were either English or Scotch, and had the reputation of being the most liberal and substantial banking firm in that country.

I left New York on the 9th of September, and after many incidents, some accidents, and escaping the robbers, I arrived all safe on the evening of the 1st of October, and went to report myself for duty the following morning, when I learned that both members of the firm were dead; one had died within three weeks, and the other one had been dead nine months This, of course, was pleasant news to an entire stranger who could neither speak nor understand the language. By hunting around I found the gas works, and then, for the first time, learned that they had never been put in operation; that they were coal works, built by an English engineer, owned by an English company, and the only party left connected with them—the Secretary of the company—a young Englishman, from whom I learned that the gas and railroad companies were virtually the same, but working under separate organizations; that no coal had as yet been found in Mexico—that the plan was to get it from England to Vera Cruz, and then carry it by rail to the city of Mexico—a very nice arrangement if the road had been completed, but it was not, and little prospect of its being so, as there was much opposition to it at that time.

Both the gas and railroad companies had received their concession or grant from the Liberal government, and had them renewed by the empire. This so enraged the Liberals when they again came into power that they refused to renew either company.

My predecessor had insisted that gas could not be made from rosin to light the city, although it was plenty and cheap (about seventy-five cents per hundred pounds). He made all sorts of objections, and advised their getting the coal up from Vera Cruz (a distance of 300 miles) by pack mules which would cost at least $125 per ton; add to this the cost at Vera Cruz of about $17 more, making the total cost $142, and taking into consideration that there is no sale for coke, it can easily be calculated at what price gas would have to be sold for to make it pay. The above does not include the loss by mules giving out and dying along the road, which is an every day occurrence.

But to return to my individual matters. The question was, Can you alter these works to make gas from rosin? I replied I could, and set about it at once. There were three benches of five clay retorts set and six open arches: these retorts had been brought from England, and in carrying from Vera Cruz were broken into many pieces. In setting they had to be cemented together, and were of but little use for rosin, or any other kind of gas. I at once commenced getting up the patterns necessary for the castings; I fortunately found a foundry run by a Belgium, who had on hand a large lot of shells and balls left by the French army. Mexican iron runs very porous, and is not fit for such castings as is required for gas works.

When I had been there three weeks it became noised abroad that an American engineer had arrived, and that now they would certainly have gas—a thing which had been repeatedly promised but never fulfilled. About the 21st of the month word was sent to me that if I could light up the Plaza (a square in front of the Palace) on the first three nights of November (they being great feast days) that the authorities would grant the concession for lighting the whole city. You can imagine it was a trying time for me; only ten days notice, with cracked clay retorts, no weights on the holder, four-inch seals in the hydraulic main, and not a siphon drip in the whole works I well understood *now* why my predecessor had predicted a blow up on

the first attempt to make gas. After eight days of hard firing I succeeded in getting up pretty fair heats, and by weighting the holder with pipes and branches suspended by blocks and falls, reducing the seal to one and a half inches, and putting in drips where necessary, I commenced making gas by a novel process, viz., introducing siphon drips through the front running to the back end of the retorts; the rosin was melted in a large kettle, and poured into the siphons by ladles full. We succeeded in giving them the gas for the time desired, notwithstanding the leaky condition of the retorts and street mains, about two miles of which had been laid previous to my coming, by a native tinsmith. The people were much pleased with the gas, but the authorities would not acknowledge themselves satisfied, being determined to throw every obstacle possible in our way.

When Congress met and a renewal of the concession or grant was asked for, one of the wise-heads opposed it, on the ground "that Mexicans did not go to the United States or England to build gas works or railroads, and he did not see what business people from those countries had to come to Mexico to build such things; he did not like these blue eyed and light haired people." (Your correspondent has both.) Very good logic, for if left to themselves there would not be an improvement made; they would stick forever to the tallow candle for light, and to the donkey for transportation.

About Christmas my alterations (so far as one bench of retorts) were made, and they worked nicely. About this time it was decided to make a test of the gas in comparison with the lamps used in the streets. This was hardly fair, as we were allowed only a four foot burner against one of their lamps, which is a self-generating camphene gas lamp, with from 14 to 19 jets, making a very brilliant light, when in good order. The test was submitted to two Mexican chemists, and they decided, much to my surprise, in favor of gas. This was an open-air test; two lamp posts were placed 140 feet apart; a board with a hole cut in was put directly in the centre, and it was decided by the length of shadow thrown—first by the lamp, then by the gas; the lamp used for this test was one of 14 jets. When the decision was given the foreigners present congratulated me on the success. This caused jealousy on the part of the Mexicans, who cannot bear to think any other nation as smart as themselves, and they insisted on having another trial, to take place a week hence. (This is their mode of doing things; putting off every thing until to-morrow.) All this time the fires had to be kept up under the retorts, which was no small expense, as our fuel was wood, costing from $10 to $12 a cord. At the second test a 19 jet lamp was tried, and the gas again pronounced the superior light. We now thought we were sure of the grant, but still all kinds of objections were made. Every little while we were called upon to fire up for some test, and then obliged to cool down again. Matters continued this way until nearly the first of May, when the authorities decided that they would like to have an illumination on the 5th of May (the anniversary of the battle of Puebla. They claim to have whipped the French, and drove them out of the city on that day, in 1862). I opposed this as it was just about the full of the moon, and any one who has seen a tropical moon-light well know how little chance any artificial light has in comparison to it, but as they were anxious to have it we gave it to them. A more beautiful or clear night could not have been, and our gas was only wasted. It was now decided that the Plaza, and one or two houses into which we had succeeded in getting the service-pipes, while the streets were being repaired, should be kept lit up for a month or two, at the expense of the company. The Ayuntimiento or Council, passed an ordinance on the 15th of May, allowing us to run the pipes and light up certain streets, binding the company to furnish 18-candle gas, and appointed a Mexican chemist to test the quality of it, which he did hourly from seven in the evening until midnight; and if he imagined it came a little short of the above requirements we heard of it at the works in a few minutes. The photometer was placed a mile from the works.

Although we had the grant from the authorities, it was of no avail until signed by the Governor of the city, which he put off doing from day to day until our patience was nearly exhausted. We then concluded that our only plan was to make some inducement, which we did, and it had the desired effect. He then set the 24th day of July, at 2 o'clock, P. M., as the day and hour which he would sign it. To prevent his making any more excuses at this time, I had fifty laborers standing in front of his office, with picks and shovels on their shoulders, and the moment the permit was handed to me the work commenced. By the 1st of October we had laid five miles of pipe. This was great work for Mexico, where things are never done in a hurry.

We had now been running regularly for about five months, and out of a population of 400,000 we only got about 50 private consumers and 100 street lamps. Our private consumers were principally foreign residents, the natives preferring the good old-fashioned tallow candles for light. Affairs certainly looked discouraging, which was unfortunate, as over half a million dollars had been expended, and a finer set of works would be difficult to find. Having now completed the alterations of the entire works for making rosin-gas, and seeing so little encouragement, I tendered my resignation for the second time, and returned home, after an absence of fifteen months, having the satisfaction to know that an American engineer was the first to introduce gas into the capital of Mexico.

In conclusion I would say to the profession, do not be too anxious to go to foreign countries, as your correspondent has been twice abroad, and both times met with many disappointments.

Yours respectfully,
J. B. CHICHESTER.

Recent American Patents.

Pertaining to Gas, Water, Etc., from the 16th to the 23rd April, 1870.

101,410.—Faucet.—John Ashcroft, New York city.

101,413.—Vapor Burner.—S. D. Baldwin, Chicago, Ill.

101,425.—Stop Valve.—Silas H. Brown, Troy, N. Y.

101,434.—Steam Generator.—Jonathan M. Clark, New York city.

101,445.—Hydraulic Engine.—William Eaton, Benn Ainsworth, and G. W. Scott, Blackstone, Mass.

101,484.—Water Elevator.—Morton S. McAtee, Chester, Ill.

101,487.—Governor for Steam Engine.—Hugh Dunbar McMaster and Abraham Dale, Guilford, Ireland.

101,491.—Apparatus for Lighting Gas by Electricity.—Walter J. Morris and William J. Reid, New York city.

101,527.—Covering for Steam Boilers, Etc.—J. E. Sharp, Eleazar Ainsworth, and F. A. Sabbaton, Troy, New York.

101,557.—Apparatus for Generating and Carburetting Hydrogen Gas.—J. S. Wood (assignor to himself and J. J. Carberry), Philadelphia, Pa.

101,579.—Water Wheel.—John Buzbo, Moorestown, New Jersey.

101,612.—Steam Heater.—F. P. Hallberg, Gottenburg, Sweden.

101,617.—Direct-Acting Compound Steam Engine.—Wm. H. Henderson, Philadelphia, Pa.

101,634.—Variable Cut off Valve Gear.—N. K. Lynch, New York city.

101,636.—Pressure Gage.—J. W. Maloy (assignor to the Maloy Pressure Gage Co.), Boston, Mass.

101,725.—Water Wheel.—J. L. Frisbie, Hillsdale, Michigan.

101,756.—Feed-water Regulator and Low-water Alarm—A. W. Morrell, Niles, Mich.

101,769.—Street Lamp.—W. G. Schmidlin and J. W. Driscoll, New York city.

101,771.—Regulating Device for Gas Burners.—Henry Schultz (assignor to himself and Henry C. Bentley), Milwaukie, Wis.

101,806.—Apparatus fer Lighting and Extinguishing Gas.—A. N. Allen and R. H. Dewey, Pittsfield, Mass.

101,832.—Pressure Gage.—Herman Chwatal, New York city, assignor to W. Staehlen and L. Portong. Antedated April 2, 1870.

101,928.—Gas Heater.—James Sheedy, New York city.

The Bessemer Patent.—The expiration of Bessemer's original patent while it permits of the use of his process of refining iron by driving air through the same when in a molten condition, does not entirely relieve manufacturers from the payment of royalties. Bessemer'r original process by itself is not capable of producing with certainty a metal of a uniform quality, and has hitherto been practised only in connection with an alloy patented by Mushet. This alloy contains iron, manganese and carbon, the natural combination speigeleisen being generally used, and is introduced into the metal while the latter is in a molten condition, insuring a product which is uniform and reliable. Mushet's patent is in the hands of the owners of Bessemer's patent, and will not expire for a year, being dated May 26, 1857. During the last fourteen years Bessemer has patented numerous improvements and apparatus, all more or less essential in practically working his process. By one of his latest patented improvemets it is said that he can save waste material equal to 5 per cent of the former product.—*Railroad and Mining Register.*

MISCELLANEA.

A Varnish for Ironwork can be made as follows: Obtain some good clean gas tar, and boil for four or five hours, until it runs as fine as water; then add one quart of turpentine to a gallon of tar, and boil another half hour. Apply hot.

Mr. R. Brown has communicated a paper to the Edinburgh Geological Society "On the Coal Fields of the North Pacific Coast," in which he shows that the supplies are abundant, but that the only coal fit for steaming purposes is found in the British possessions, all others being of tertiary age and very inferior in quality. In these coal-fields, as he remarks, British Columbia has within itself the elements of lasting prosperity.

The question whether the mere selling of articles made by a patented machine amounted to an infringement of the patentee's right, has been argued in the English Court of Exchequer. The judges held that the patent laws protected not only machinery, but articles made by it, and that the purchase and sale of such articles were to be considered as an infringement of the rights of the patentee.

Prof. Rood on the Electric Spark.—As a resul of various experiments, Prof. Rood finds that the discharge from a Leyden jar charged by an induction coil, is composed of three parts of successive acts—a white flash, a brownish yellow gleam, and a fainter and more lasting glow, which, with brass electrodes, is green, and, with platina, grey, in color. The duration of the entire phenomena is from seventeen to fifty millionths of a second. The duration of the white and yellow light together is six to eight millionths, and that of the white flash alone less than twenty-four hundred millionths of a second.

Bricks from Gas-Coal Ashes.—Walls of remarkable lightness, porosity and dryness may be built cheaply of bricks made from the ashes of the coke derived from gas-works. Mr. Wagner, the first inventor of the process for effecting this, instructs us as follows as to his *modus operandi*: "The ashes, after being taken from the retorts, are spread on the surface of a clean floor; they are then finely pulverized, and 10 per cent. of slacked lime, together with a small proportion of water, is intimately stirred and incorporated with them. After a rest of twenty-four hours, the mixture is made into bricks by the ordinary process. These bricks are immediately transferred to the drying sheds, where a few days of exposure renders them fit for use.

Lighting Up Beacons and Buoys by Electricity.—Prof. Fleming Yenkin has discovered and patented a new method of lighting the beacons and buoys on the sea coast by electricity, giving a bright permanent and unmistakable light to guide the mariner and preserve him from treacherous rocks and shoals. The light is produced by a rapid succession of sparks, due to successive charges and discharges of a condenser situated upon the beacon or buoy. This is charged directly with a voltaic battery, without the intervention of an induction coil. The communication is made by means of submarine wires, running from the shore to the beacon or buoy, and can be operated thoroughly by parties on shore. The invention is considered in all respects practicable; and it is certainly to be hoped that it is so, and we hope to see it adopted on the dangerous parts of our coast, as one of the means of rendering less the dangers of the seas.

NOW READY AND FOR SALE.
FODELL'S SYSTEM
OF
Bookkeeping for Gas Co.'s.

Price, $5, which should be sent either in Check, P. O. Order, or Registered Letter.

M. L. CALLENDER & CO.,
Office GAS-LIGHT JOURNAL, 29 Pine st., N. Y.

R. D. WOOD & CO

MANUFACTURE

CAST IRON GAS AND WATER PIPES.

PHILADELPHIA.

On hand, several thousand feet 3, 4, and 6 inch Pipes, for immediate delivery. 226-6m

S. H. HENDERSON, Selling Agent,
No. 173 Broadway, New York.
SECOND FLOOR.

SABBATON'S PATENT
COKE AND COAL
SCREENING SHOVELS.

Made from best Mallable Iron.

FURNISHED WITH LONG OR D HANDLDS.

Perfect in their operation. Very strong and from their great durability vastly more economical than any substitute. Refer to all the principal Gas Companies of the country, who acknowledge them as the "ne plus ultra" of Coke Screening Shovels.

Orders addressed only to

O. R. BUTLER,
Sole Agent.
No 126 Maiden Lane, N. Y.

RILEY A. BRICK,

MANUFACTURER OF

CAST IRON PIPES,

FOR WATER AND GAS,

ALSO,

GAS WORKS & MACHINERY CASTINGS

Of Every Description.

No 89, White Street, New York.

BERRY'S PREMIUM
FIRE PROOF BRICK WORKS.

Established in the Year 1812,
Baltimore, Maryland.

The Experience of FIFTY-SEVEN Years attests the Quality of our

Premium Fire Proof Bricks, Tiles, Etc.

which, with cement for laying the same, are constantly on hand in large quantities.

Our thorough knowledge of the materials we use, enables us to guarantee to IRON, COPPER, CHROME and GAS WORKS, also Refineries of Metals, Sugars, etc., etc., an exact size and form, with drawings or patterns sent us, for any Bricks ordered; which with

RETORTS,

will be furnished on short notice.

Office and Works bounded by Russell, Warner, Hamburg, and Cross Streets.

☞ Promptness and Dispatch given to all orders.

John S. & George R. Berry,
227-1y Baltimore, Md.

SECOND HAND STATION METER, ETC.

PARTIES DESIROUS TO DISPOSE OF A SECOND hand Station Meter, and other Connections and Cast, ings, in good order, of about six inch openings, will please address M. L. CALLENDER & Co., 22 Pine St., N. Y. stating terms.

BIRD, PERKINS & JOB,

IMPORTERS OF COAL FROM

PICTOU,
SYDNEY,
LINGAN,
LITTLE GLACE BAY,
PORT CALEDONIA,
AND NEWCASTLE.

ALSO AGENTS FOR THE

Westmoreland Coal Company's Gas Coal,

AND IMPORTERS OF

INCE HALL HOUSE CANNEL.

89 INDIA WHARF, Boston. 86 SOUTH STREET, N. Y. [248

F. H. ODIORNE,

IMPORTER AND DEALER IN

PICTOU, SYDNEY LINGAN, NEWCASTLE, CANNEL AND WELSH COALS.

Agent for the New England States, for the sale of the

Delaware, Lackawana, and Western Railroad Company's Scranton Coal.
Cumberland Coal and Iron Company's George's Creek Cumberland Coal.
Penn Gas-Coal Company's Superior Gas Coal.

Also, Agent for the { Gowrie Mines, Cow Bay, / International Co.,s Union Mines, Bridgeport, / Acadia Coal Company, of Pictou. / Little Glace Bay Mining Co. } Nova Scotia.

No. 146 Broad Street, Boston.

C. B. SWAIN,
No. 137 Front Streat, New York.
2 -1

THE NEWBURGH
ORREL COAL COMPANY,

Mines at Newburgh, Preston County, West Va.
Company's Office, No. 52 S. Gay street, Baltimore, Md.
C. OLIVER O'DONNELL Pres't. G. W. MAHOOL, sec'y.
CHAS. W. HAYS, Agent in New York, Room 7, Trinity Building, 111 roadway
W. D. CRANE & Co., 26 Kilby street, Boston.

This Company offer their very superior Gas Coal at lowest market prices.

It yields 10,936 cubic feet of gas to the ton of 2,240 lbs., of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,192 cubic feet, with a large amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York; the Brooklyn and Citizens' Gas Light Companies of Brooklyn, N. Y.; the Baltimore Gas Light Company of Baltimore, Md., and Providence Gas Light Company, Providence, R. I

The best dry coals shipped, and the promptest attention give to orders. 224-1

THE DESPARD COAL COMPANY

OFFER THEIR SUPERIOR

DESPARD COAL

To Gas Light Companies throughout the country.

Agents, PARMELEE BROTHERS, No. 32 Pine street, N. Y.
BANGS & HORTON, No. 31 Duane street, Boston.

Mines in Harrison County, West Virginia.
Wharves, Locust Point, / Company's Office, 29 South street. } Baltimore.

Among the consumers of Despard Coal, we name: Manhattan Gas Light Company, New York; Metropolitan Gas Light Company, New York; Jersey City Gas Light Company, N. J.; Washington Gas Light Company; Portland Gas Light Company, Maine.

*** Reference to them is requested. 204-1y

West Fairmount Gas Coal Mines.

HENRY Y. ATTRILL, Proprietor.

Mines at Fairmount, Marion Co., West Va.

Oliver Jackson, Esq., Pres. First National Bank of Fairmount, Manager.

Wharves, Hankey's Locust Point, / Office, 35 S Gay-street, } Baltimore, Md.

I offer this superior coal to Gas Companies throughout the United States—SUPERIOR TO ANY. See analysis by Engineer Manhattan Gas Light Company of New York in the "Gas-Light Journal" vol. X, No. 218, p. 217. Orders solicited from Gas Companies, Gas Manufacturers, and shippers of Coal by the cargo

This coal, by analysis of Jos A Sabbaton, gave a yield of 9,651 cubic feet, and 9,500 cubic feet to the ton with an ILLUMINATING POWER OF 19.50 CANDLES, AND 40 BUSHELS COKE. 215-3m

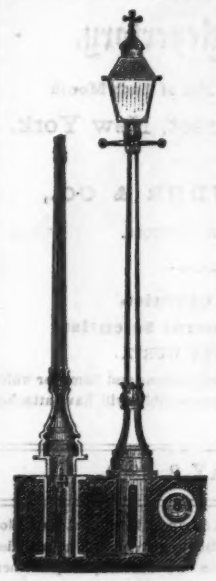
FAIRMONT GAS COAL COMPANY OF NEW YORK.

Mines at Fairmont, Marion County, West Virginia.
Office, 47 Exchange Place, New York.
A. N. MEYLERT, President. HIRAM BENNER, Sec'y and Treas.

THIS COAL IS OF VERY SUPERIOR QUALITY. with an illuminating power of 19 candles, yielding over 10,000 cubic feet of gas to the ton, and an excellent coke.
The orders of Gas Companies solicited. 233-tf.

BRANSON'S PATENT LAMP POST

THE ADVANTAGES OF THIS PATENT POST over the old style, are as follows:



1st. The saving of the base or bottom part of the Post, when the column is broken, the Post being made in two parts. The broken column can be replaced by a new one, without disturbing the base.

2d. When the old style of post is broken, the bottom piece has to be dug out, which cannot be done in winter, or in wet weather: all this is obviated in this Post, as no digging is required. This style of Pos is especially desirable when flag stone sidewalks are used.

3rd. When a stoppage of gas in stand pipe occurs, the column can be lifted out, the pipe detached, cleaned, and replaced in fifteen minutes; no digging being required as is now done with the old Post.

4th. A lighter and better casting can be made from this patent, and it can be handled better, owing to its length and lightness.

5th. In case a broken column cannot be repaired, one third of the original cost is saved by the base being secured and perfect.

Rights for States, or the United States, on reasonable terms. Address, Editors GAS-LIGHT JOURNAL, 22 Pine street, N. Y.

Certificate.

ST. LOUIS, September 1, 1869.

I have examined a new Lamp Post, the Branson patent, and unhesitatingly pronounce it to be the best thing of the kind I have ever seen. Posts of this description have been erected in this city, and in my opinion this style of Post should be universally adopted, as I believe it possesses all the advantages claimed for it.

The St. Louis Gas-Light Company have adapted this Post and ordered a large quantity for immediate use.

THOMAS PRATT,
587-6m Sup. t. Louis Gas Works.

THE FAIRMONT GAS COAL CO. OF NEW YORK.

Office TRINITY BUILDING, No. 111 Broadway, Room 71.

Wharves at Locust Point. Baltimore.

Mines at Fairmont, Marion Co, W. Virginia.

THE FAIRMONT GAS COAL COMPANY OF New York, solicit the orders of Gas Companies for their VERY SUPERIOR GAS COAL.

The Coal from their Mines is remarkably free from sulphur.

For Gas Companies our Coal is carefully screened and shipped, free of slate and other impurities.

This Coal has an illuminating power of 19 candles, yielding over 10,000 cubic feet of gas to the ton, and a large amount of excellent Coke.

Refer to the Manhattan Gas-Light Company, New York, and the New York Gas-Light Company, New York.

HIRAM BENNER, Sec. and Treasurer. A. N. MEYLERT, President.
246

GAS AND KEROSENE FIXTURES

THE TUCKER MANUFACTURING CO.

39 & 41 PARK PLACE, NEW YORK. AND 117 AND 119 COURT STREET, BOSTON.

MANUFACTURERS.

Offer the largest variety of New and Handsome Designs of GAS and KEROSENE FIXTURES to be found in any establishment in the country, comprising in both lines an unusual variety of large and massive Fixtures, especially adapted for Churches, Halls, Hotels, Stores, and other Public Buildings, together with a large variety of patterns suitable for dwellings. 245

BUTLER'S
Patent Gas Works,

JOHN BUTLER, Sole Manufacturer,
126 MAIDEN LANE, NEW YORK.

OIL AND ROSIN GAS WORKS (all sizes) for Towns, Factories, Plantations, Churches, and Private Dwellings. These Works are warranted to make cheaper gas than any small Works known, and are very simple to manage. Refer to *over three hundred now in use from one to thirteen years.*

Estimates furnished for cost of Works, and the cost of manufacturing Gas in various localities.

Send for descriptive pamphlet.

1-3m JOHN BUTLER, 126 Maiden Lane.

THE

AMERICAN GAS-LIGHT JOURNAL,

AND

Chemical Repertory.

Published on the 2d and 16th of Each Month

At No. 42 Pine Street, New York.

M. L. CALLENDER & CO.,

EDITORS AND PROPRIETORS.

'Consulting Chemist,'
Geologist and General Scientist,
PROFESSOR HENRY WURTZ.

[Note by Professor Wurtz.—Contributions and items for which I am, as a Scientist, individually responsible, will have attached my full name or initials.—H. W.]

MONDAY, MAY 2, 1869.

Wishing to make this Journal an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of those subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS* or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

☞ News Agency.—The American News Company, 119 and 121 Nassau street, New York, are agents for this Journal. Newsdealers will please send orders to them.

NOTICE.

☞ *All Collections for Advertisements, Subscriptions, etc., are made directly from this Office. We have Agents to solicit the same, but they are not authorized to Receipt for Money.*

TO OUR SUBSCRIBERS AND PATRONS.

In making remittances for subscriptions, always procure a draft on New York, or a Post Office Money Order, if possible. Where neither of these can be procured, send the money, but always in a Registered Letter. The registration fee has been reduced to fifteen cents, and the registration system has been found by the postal authorities to be virtually an absolute protection against losses by mail. All Postmasters are obliged to register letters whenever requested to do so.

CONTENTS.

Pye's Patent Locks.....129
The Louisville Gas Works.....130
Peoria Gas Works.....130
The Suez Canal—Opinion of a Leading Engineer.....130
The Extraction of Ammonia from Gas, and Utilization of the Product.....131
Prof. Chandler on the Purity of Croton Water.....132
Chemical Repertory—
The Lightning-Rod Controversy.....132
Answer of Prof. Van der Weyde to Prof. Walling's Second Rejoinder (continued).....132
American Chemical News—
Farmer's Theorem.....133
Correspondence—
Interesting Letter from a Gas Engineer.....133
Recent American Patents.....134
Miscellanea.....134
Editorials—
The Harlem Company and the Murphy Run Coal.....136
What is Thought of the Journal.....136
The Utilization of Heavy Hydro-carbons, for Increasing the Light of Coal Gas.....137

JOB PRINTING.

STOCK CERTIFICATES,
ASSESSMENT RECEIPT BOOKS,
TRANSFER JOURNALS,
CIRCULARS,
HAND BILLS,
CARDS,
BILL HEADS,
ANK FORMS FOR GAS COMPANIES,

And every kind of Job Work that may be desired, executed at the office of The American Gas-Light Journal, No 42 Pine street, New York.

NOTICE—REMOVAL.

Owing to our Large and Constantly Increasing Business, and Especially the Patent Agency Department, we have been obliged to obtain Larger and More Commodious Apartments at

NO. 42 PINE STREET.

Our Offices will be Permanently Established at No. 42 Pine Street, after May 1st.

THE HARLEM COMPANY AND THE "MURPHY RUN" COAL.

In our last there was promised to our readers some statements of facts and figures regarding the improved purifying operations introduced of late by the Harlem Gas-Light Company in their works at One Hundred and Eleventh street, based essentially on the use of the new methods and composition of Messrs. St. John and Cartwright; which have received from us of late, as our readers are aware, a large share of attention, and will receive more, in accordance with our present assured conviction that these improvements will make their way rapidly into use in all of our Gas Works, wherein peculiar and exceptional objections do not exist.

The future which lies before the Harlem Gas-Light Company, is such as to attach special interest to any operation of theirs. Their district, which is rapidly increasing in population, wealth and traffic, covers nearly *half the area* of the Municipality of New York.

As the information may be interesting and novel to many of our readers, we give here the boundaries of the districts of our four large city gas-companies:

New York Gas-Light Company, below Grand street, from river to river.

Manhattan Gas-Light Company, below Thirty-fourth street to Grand, from river to river.

Metropolitan Gas-Light Company, below Seventy-ninth to Thirty-fourth street, from river to river.

Harlem Gas-Light Company, above Seventy-ninth street to Spuyten Duyvil Creek and Kingsbridge (225th street).

Some further interesting items of information about the Harlem Company, may be appropriately introduced here; for which we were indebted, on the occasion of our visit, to the intelligent and efficient Engineer of the Company, Mr. Balmore.

The present organization of the Harlem Company is as follows:

BOARD.

President—Burr Wakeman,		Down-Town Office, No. 76 Nassau street.
Sec. & Treas.—Henry P. McGown,		
Christian Zabriskie, Jr.,		
Thomas Rutter,		
Robert W. Rodman,		
James M. Halsted,		
Abraham R. Van Nest,		

Superintendent—Jacob M Long.
Engineer—John Balmore.

At their One Hundred and Eleventh street Station they have now two holders, one of a daily working capacity of 250,000, the other of 600,000 feet; and they have just broken ground for a new one, of the same capacity as the latter, in provision for their rapidly increasing consumption. They have also a small holder at Kingsbridge, at the extreme northern point of New York Island, to which gas is now sent all the way from the Retort House in One Hundred and Eleventh street, a distance probably not less than eight miles, on the course of the mains. This points to the necessity, before many years, of another Station, somewhere on the west side of the Island, for the supply of the long reach of their district (nearly six miles inall), along the North River shore.

Their present daily make ranges from 400,000 to 600,000 feet; but of course their consumers are increasing in a much greater ratio than those of our other Companies. Their make in 1869 (150,000 feet) seems trifling by the side of the stupendous figures of the Manhattan Company (who carbonized during 1869 no less than 140,000 tons of coal, and made about 1,400 million feet of gas); but the *future* is all before them.

The coal now in use, is exclusively the *Murphy Run*, of West Virginia, which yields them now, by reading of their Station Meter, 4.55 feet of gas per pound, or 10,200 feet per long ton; of about 17 to 18 candle-power, according to the photometric record of Mr. Balmore. This splendid yield, however, is of a highly sulphuretted gas; and hence has come the introduction of the grand improvements in purification, which we treated of in our last issue (page 120) promising then a further account, a promise which we shall now proceed to fulfil.

During the dark days of the past winter the daily demand rose to 600,000 feet; and as a bushel of lime would not purify with certainty much more than 3,000 feet of this gas, it was necessary to handle 200 bushels of it daily, requiring the constant labor at times of seven men, five men being the minimum. The daily cost of the lime was $24, besides the labor. Moreover, the capacity of the present Purifying House—four purifiers of 20 by 25 feet each—was insufficient; and the necessity was contemplated of the immediate creation of an additional House of the same size, occupying additional space, and costing *sixty thousand dollars*. Owing to the tediousness of the purification, the greatest difficulties and embarrassments were constantly met with.

On the adoption of the improved iron process of St. John and Cartright, the relief at once experienced was beyond all previous conception. In the words of the Engineer to me, it was "like sailing at once from a tempest into a calm sea!" The boxes which would hold but 250 bushels of lime (on trays), now hold 400 bushels of St. John and Cartwright's preparation (which is merely shovelled in, *in bulk*). One such charge requires no less than *five days*, with their present make of 400,000 per day, to foul. Thus for each 133 bushels of lime that had to be handled previously, and spread out in trays, but 80 bushels of the new preparation need be handled. The general results are that the amount of labor necessary (including the revivification, the iron preparation being continuously revived and used over again) is practically reduced one half about the Purifying House. Moreover the Engineer's calculation is that the erection of the new and expensive Purifying House may now be deferred for not less than five years longer.

Nor is this yet all. The prejudices on the part of the public against Gas-Lime have become so great, that since the adoption of the new improvement, as I am told, the current prices of real estate in the vicinity of these Works have risen in an important degree.

I have more to say, and especially about the *Murphy Run Coal*, which is here used with such unexampled advantage; but the length of this article makes it imperative that this part of the subject be put off till the next occasion. H. W.

WHAT IS THOUGHT OF THE JOURNAL.

The following is here repeated from the "Correspondence" columns of our last issue (page 118):

"Permit us to say that the series of articles in

your Journal, some time ago, entitled "Facts About Gas for the People," were read with great interest: and that many of your readers would like to have them appear again in the Journal."

From every hand come to us words of approval of the contents and conduction of our Journal, most cheering and encouraging, so far as words can go. We cite again from a letter just received from a distinguished gentleman, who is a very extensive scientific contributor to a number of our journals:

"* * * * and I wish that you would let me have the GAS-LIGHT JOURNAL in exchange for this publication, directed to my address. There are so many items in your valuable Journal that ought to be extensively noticed, that I am sorry to miss them, and if I have them I can cite them in the various papers for which I write."

Other flattering sentences in this we could not copy without betraying its authorship, which, as the letter is private, is inadmissible without express consent.

It is clear that our labors meet with the approval of the discerning among our friends and patrons.

THE UTILIZATION OF HEAVY HYDRO-CARBONS, FOR INCREASING THE LIGHT OF COAL GAS.

The residuum or heavy oil left from the distillation of petroleum and coal tar, after all the lighter burning oils and other valuable products have been removed, has hitherto been of small commercial value; it now bids fair to take its stand in future, as the most valuable agent for carburetting coal gas that has yet been discovered. The inexhaustable supply of such rich hydro-carbons offers a great field for commercial enterprise, and must very much reduce the consumption of gas. The heavy oil that distils over between a temperature of 400 and 500 deg. Fahrenheit scale, contains very little hydrogen. When dropped into a red hot retort, scarcely any of it will undergo destructive distillation, because there is not enough hydrogen to chemically combine with the excess of carbon, to form a permanent gas. This oil is so rich in carbon that it cannot be burned in a lamp; it chokes up the wick and gives off dense volumes of smoke, and sufficient air cannot be combined with it when burned alone, to make the combustion perfect. But when the vapor from this oil is mixed with a jet of coal gas, the light is increased to an enormous extent; the dense carbon of the oil is heated to a white state of incandescence in the hydrogen of the coal gas flame, and the light is the perfection of artificial illumination; all colors viewed by it retain their natural tints; the flame is steady and intensely brilliant. A three foot jet of gas is sufficient to light a large room, equal to six such jets uncarburetted.

Mr. Joshua Kidd, of 75 Maiden Lane, New York, has for the last ten years, directed considerable attention to this subject, and has been untiring in his efforts to utilize the lighting properties of these hitherto useless hydro-carbons. His efforts have been crowned with success, and his patented method of mixing coal gas with the vapor of heavy oils is perfectly safe, and allowed by the Board of Fire Underwriters. It enables every gas consumer to obtain from a three foot jet as much light as he now gets from a four foot chandelier. The process has been in operation for the past twelve months in New York, in churches, stores, public buildings, etc., with great success; and the patentee has just adapted the method to single lights, the carburetters for which may be bought at $2 each,

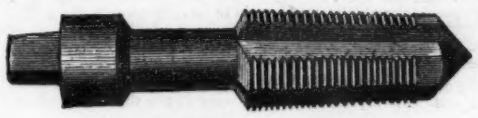
Hitherto the process has only been applied to clusters of lights for lighting large rooms; but *it* application to single lights places the advantages of this process within the reach of every gas consumer. City Corporations or Gas Companies may with great economy use this process for public street lights. One pound of heavy hydro-carbon contains 7,000 grains, and will carburet 200 feet of gas; it is sold at two cents per pound. Thirty-five grains mixed with one foot of coal gas increases its lighting properties 400 per cent. From what we have seen of it we think it of great commercial importance, both to consumers and manufacturers of gas.

F. E. Stimpson, State Inspector of Gas Meters, in his annual report to the Massachusetts Legislature, states that he had inspected 11,814 meters during the year; 7589 new, 4121 old or repaired, and 104 offered for reinspection. Of these 11,511 were sealed, 4926 of which registered an average of one and two-tenths per cent. against the company, 3138 registered an average of one and eight hundredths per cent. against the consumer, and 3447 were quite correct. The extreme of incorrect registry allowed is two per cent. Only 303 were rejected; of these 182 averaged 5 6·109 per cent. against the company; 120 averaged 4 91.100 per cent. against the consumer; while one was rejected for fault of construction. Only 36 registered over five per cent. against the *company;* of these one was 26 per cent. and another 20. Only 30 registered more than five per cent. against the *consumer;* of these *one* was 18, and another 13 per cent.

[The above item was taken from a paper, and published in our last issue, under the impression that it was reliable. We have, since then, received a letter from Mr. Stimpson, informing us of its incorrectness, and we republish it with the corrections.—EDS.]

NOTICE.—WILL CHARLES GREENE, WHO had an Electrical Engine on exhibition at the late Mechanics' Institute Fair in this city, please send his address to the Editors of this Journal, and oblige.

Will CHARLES JONES of Philadelphia, who sent us a comunication a few weeks ago, about Hydrogen Gas Apparatus, please communi ate his present address.



HUMPHREY'S

CONDENSED DRILL, REAMER AND TAP.

The best tool for Tapping Gas and Water. Address,

WILLIAM HUMPHREY,

244–6m Waterford, N. Y.

SPECIAL NOTICE.

TO GAS-LIGHT COMPANIES.

INFRINGEMENT.

AS SABBATON'S PATENT COKE SCREENING SHOVELS have been infringed upon, this is to caution all parties against using, or having upon their premises the spurious article, as proceedings will be commenced against such. The genuine Screening Shovel can only be obtained from the Agent of the patentee.

O. B BUTLER, 125 Maiden Lane.

EVERY MAN HIS OWN PRINTER.—WITH one of our Presses, and the Material accompanying it, every man can do his own printing, thus saving much time and expense. Circulars containing full information about these Presses, prices, recommendations, etc., mailed free on application. Specimen-books of types, cuts, borders, etc., 10 cents.

ADAMS PRESS CO., 53 Murray St., N. Y.

S. FULTON & CO.,

PLYMOUTH IRON WORKS,

Conshohocken, Pa.

Manufacturers of

PIG IRON & CAST IRON GAS & WATER PIPES.

Also, Heavy & Light Castings of every description.

412 Walnut street, Philadelphia, Pa.

SAMUEL FULTON, THEO. TREWENDT.

THE PERFECT

STREET AND DEPOT LAMP.

The Lamp offered by this Company has been brought to a degree of PERFECTION not equalled by any other Lamp in the market.

It is the *Cheapest, Handsomest, Most Durable, Most Difficult to Injure* and *Most Easy to Repair, Most Easily Lighted,* and *Most Economical* Street Lamp used in every respect.

In Use in Over 300 Towns and Cities.

Send for Descriptive Pamphlet and Price Lists.

THE HEATH & SMITH MANUFACTURING COMPANY,

PORTLAND, CONN.

SALESROOMS:

44 Murray Street, New York City.

52 Randolph Street, Chicago, Ill.

AGENTS:

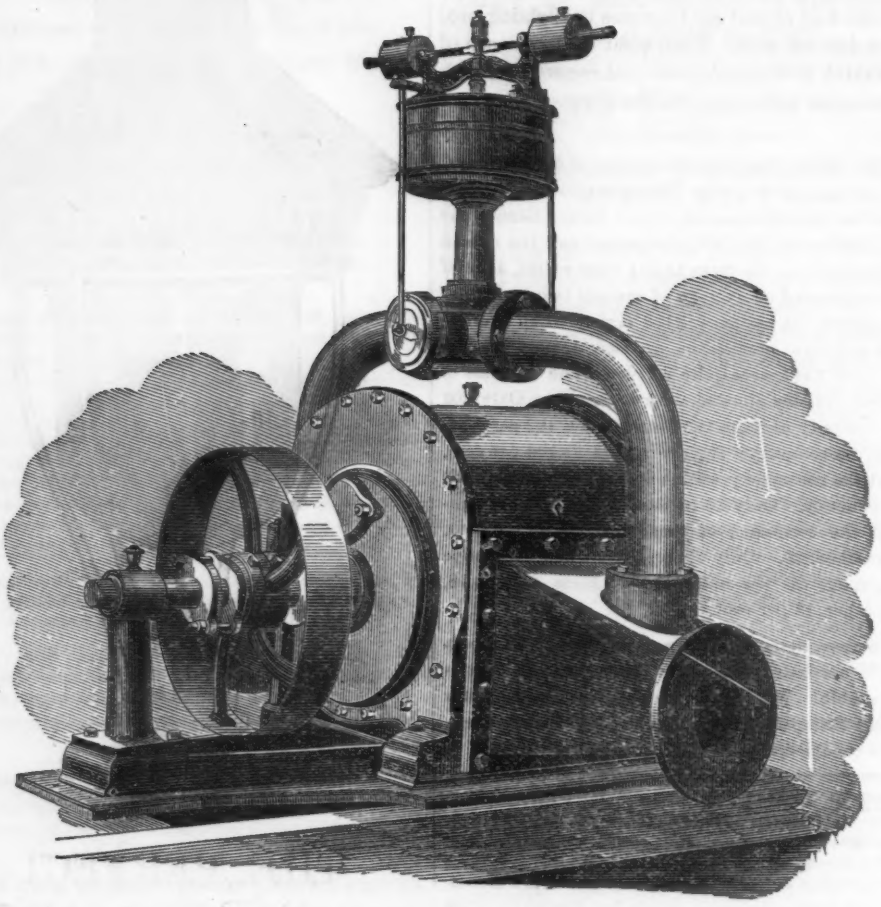
KEEN & HAGERTY, Baltimore, Md.

CHAS. F. ADAMS, 20 Milk St., Boston, Mass.

248–6m.

Smith & Sayre Manufacturing Company.

The Mackenzie Patent Gas Exhauster, AND PATENT COMPENSATOR.



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

MACKENZIE PATENT BLOWER, PATENT CUPOLA AND SMELTING FURNACE.

The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary Fan. The Cupolas are manufactured in sizes to melt from 1 ton to 20 tons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent. fuel. Address

B. KREISCHER,, President.
JAMES SAYRE, Treasurer,
CHARLES W. ISBELL, Secretary Office, 95 Liberty street, New York.

KEYSTONE IRON WORKS,

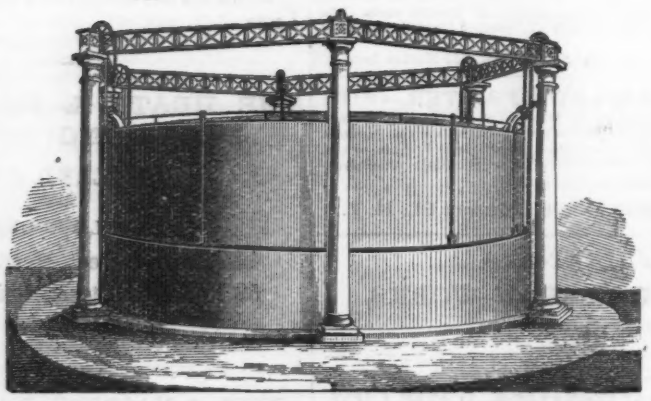
2132 Filbert Street, Philadelphia.

G. W. KRAFT, PROPRIETOR,

MANUFACTURES

GASOMETERS,

COAL CARS, PURIFYING OXES, COKE BARROWS.



RETORT HOUSE ROOFS, WATER TANKS

Wrought Iron Work for Bridges, Buildings, Steam Boilers, Tanks, Stills, &c.
Particular attention paid to Alterations and Repairs.

LUDLOW VALVE MF'G CO

OFFICE 193 RIVER ST., TROY, N. Y.

Make Valves 4-inch to 24 inch, for Water, Steam & Gas.

FIG. 1.

Fig. 1 shows a single gate valve.

Fig. 2 represents wedge and one-half of gate of double valve, intended for larger sizes, when required to bear heavy pressure either side.

Fig. 3, represents a section through body, gate and wedge.

The slides, G G, are held against wedge D, by ribs, H H, projecting from sides of valve body, A.

In closing the valves, when opening I is covered, slides, G G, pass the lower ends of ribs, H H, when the wedge, D, can move forward on the inclined planes E E, and crowd the gates apart.

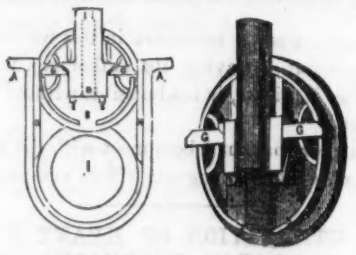


FIG. 3. FIG. 2.

[From A. F. Havens, Engineer Brooklyn Gas-Light Co.]

"I take great pleasure in saying that they give perfect satisfaction—opening easily and quickly, and requiring no effort to start them, even after they have been closed for months."

[From R. E. Roberts, Secretary Detroit Water Works.]

"Commenced using your valves in 1865; have over 200 in use: have given satisfaction."

More than 80 Gas and Water Companies have them.
Send for Descriptive Circular.

J. S. HOBBIE & SON,

SUCCESSORS TO

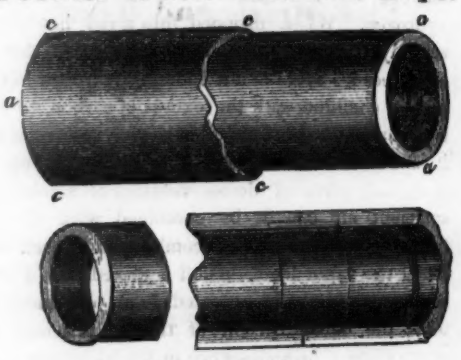
WYCKOFF, BROS. & CO.,

ELMIRA, N. Y.

MANUFACTURERS OF

WYCKOFF'S PATENT IMPERISHABLE

Wooden Water and Gas Pipe.



These Pipes combine

Strength, Durability, and Economy.

The Water Pipes are the cheapest and best in use for watering Cities and Villages, conveying water to Railroad Tanks, Distilleries, Breweries, Tanneries, and water courses of every description.

Wyckoff's Patent Gas Pipe is less expensive than other kinds, more serviceable and more durable; being coated, inside and outside, with imperishable material, and impervious to air, gas or water, and warranted to give satisfaction. 2:9tf

MITCHELL, VANCE & CO.

Manufacturers of

CHANDELIERS

And Every Description of

GAS FIXTURES.

Also Manufacturers of

Fine Gilt, Bronze and Marble Clocks, Warranted best Time-keepers, Mantle Ornaments, &c.

SALESROOM, 597 BROADWAY,

(Rear Entrance 140 Mercer Street.)

Special designs furnished for GasFixtures or Churches, Public Halls, Lodges, &c. } New York

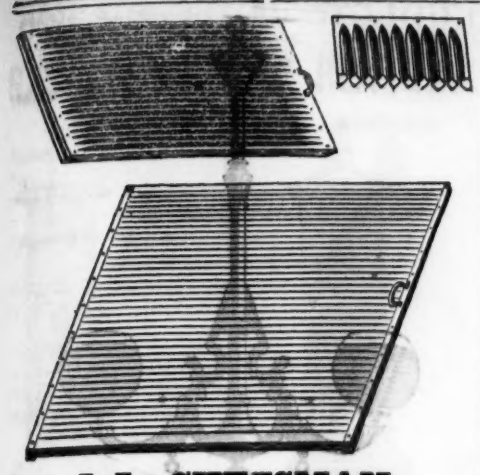
CHAS. HOWDON SMITH,

BROKER IN MINING STOCKS

AND OTHER SECURITIES,

No. 165 BROADWAY,

NEW YORK.



J. L. CHEESMAN,

Manufacturer of Patent Conically and Diamond Slotted SOLID WOOD TRAYS.

The advantages of these Trays over those made of Iron, are economy (they being over 200 per cent cheaper than Iron. and will last twice as long), a greatly increased purifying surface, and a saving of time and labor in removing the lime, as it does not adhere to the smooth surface of the Wood Trays, as is the case with the Iron. The top cut represents the new diamond slotted or reversable Tray, a very superior improvemen'.

JOHN L. CHEESMAN,
151 and 153 Avenue C, New York.

MANHATTAN

Fire Brick & Enamelled Clay Retort Works,

MAURER & WEBER,

(Of the late firm of B. Kreischer & Co.)
PROPRIETORS.

Office & Works in 15th street, Avenue C,

MANUFACTURERS OF

Fire Brick and Tiles,

OF ALL SHAPES & SIZES,

Fire Mortar, Clay and Sand.

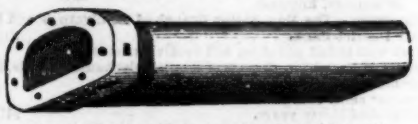
☞ Articles of every description made to order, at short notice. (135

HY. MAURER. ADAM WEBER.

NEW YORK

Fire Brick and Clay Retort Works

☞ *Established in* 1845. ☜



(Branch Works at Kreischerville, Staten Island.)

B. KREISHER,

Office 56 Goerck St, cor. Delancey, New York.

GAS RETORTS, TILES and FIRE-BRICK of all shapes and sizes. FIRE MORTAR, CLAY, and SAND.
rticles of every description made to order at the shortest notice.
B. KREISCHER.

BROOKLYN CLAY RETORT AND

FIRE BRICK WORKS,

Van Dyke Street, Brooklyn, New York,

MANUFAUTURERS OF

CLAY RETORTS FIRE BRICK, TILE, Etc.

J. H. GAUTIER & CO.,

JERSEY CITY FIRE BRICK WORKS

MANUFACTURERS OF CLAY GAS RETORTS,

Tiles, Blocks, and Fire Bricks.

☞ WORKING DRAWINGS

OF SETTINGS FOR BENCHES OF THREE, FIVE AND SIX RETORTS

FURNISHED FREE TO ANY GAS COMPANY.

Greene, Essex and Bergen-sts., Morris Canal Basin, Jersey City New Jersey. (208t

---

ATLANTIC DOCK,

IRON AND MACHINE WORKS,

Ferris, Wolcott and Dykeman Streets,

SOUTH BROOKLYN.

HOY, KENNEDY & CO., Proprietors.

Office 98 Liberty Street. P. O. Box 2,348.

HOY, KENNEDY & CO.,

ENGINEERS AND CONTRACTORS

For the Erection or Extension of Gas Works.

PLANS, SPECIFICATIONS AND ESTIMATES.

MANUFACTURERS of every kind of Gas Machinery, Retorts, Bench Castings, Wrought Iron Work, Multitubular and Air Condensers, Washers, Scrubbers, Purifyers, Exhausters with every equipment complete for large or small Works, Gasholders, Telescopic or Single; Iron Roof Frames with Cornice Gutters, covered with Corrugated Iron or Slate; Iron Doors and Iron Pivot Blind Windows; Coke Barrows, Fire Tools, Retort Lids, Cotter Bars and Screws, Stop Valves, Tar Valves for Regulating Dip in Hydraulic Mains, Pressure Governors for Street Mains, and Compensators for Exhausters that are unrivalled for unvarying accuracy; Steam Engines, Boilers, Etc., Etc.

Agents for G. W. EDGE'S PROCESS for removing Carbon from Retorts.

Post Office Box 2,348. Office, 98 Liberty st., N. Y. (224-1y

JERSEY CITY

GAS METER WORKS.

R. M. POTTER & CO.,

MANUFACTURERS OF

CONSUMERS GAS METERS, WET AND DRY,
Station Meters, Center Seals, Governors,
Pressure Registers, and all kinds of Pressure Gauges,

Experimental Meters and Standard Test Gasholders.

☞ And all apparatus in use at the Gas Works. ☜

14 Morris St., Jersey City, N. J. (1y.

LACLEDE FIRE BRICK

AND

CLAY RETORT WORKS

CHELTENHAM, ST. LOUIS CO., MO.

HAMBLETON & GREEN

PROPRIETORS,

Office, No. 1007, North Levee,.....St. Louis.

Philadelphia Fire Brick Works,

Corner of Vine and Twenty Third sts., Philadelphia,

JOHN NEWKUMET,

Manufacturer of all kinds of FIRE-BRICK, GAS-HOUSE TILES, to suit all the different plans in use. Clay-Retorts and Dentist Muffles. Orders filled at short notice.

WORKS UPON GAS.

BOWDITCH.—THE ANALYSIS, TECHNICAL Valuation, Purification, and Use of Coal Gas, with illustrations., 8vo. cloth. Price, $6.25.

BOWER—Gas Engineer's Book of Reference, illustrated, 4to. Price, 75c.

CLEGG—Treatise on the Manufacture of Coal Gas, 5th edition, enlarged, 4to, cloth. Price, $10.50.

COLBURN—The Gas Works of London, 12mo., boards. Price, 60 cents.

CROLL—Report of the Proceedings on the Arbitration with the Great Central Gas Consumers' Company, 8vo., cloth. Price, $2 50.

HUGHES—Gas Works and Manufacturing Coal Gas, 12mo. Price, $1.50

MASON—The Gasfitters' Guide, paper. Price, 50 cents.

D'HURCOURT—De l'Eclairage du Gaz. Par E. R. Hurcourt 3d edition. Paris, 1863; 8vo. and plates, $7.50.

RICHARD—Gas Consumers' Guide, 12mo., Price, 50 cents.

SWEET—Special Report on Coal, showing its Distribution, Classification, and Cost, delivered over different routes to various points in the State of New York, and the principal cities on the Atlantic Coast. By S. H. Sweet, with Geological Maps. 1 vol. 8vo. cloth, $3.

SUGG—Gas Manipulation, with a description of the various Instruments and Apparatus employed in the Analysis of Coal and Coal Gas, 8vo, cloth. Price, $7.50.

WILKINS—How to Manage Gas, 24mo., paper. Price, 25c.

SCHILLING—Traite d'Eclairage par le Gaz. Price, $22.

For sale by

D. VAN NOSTRAND, Publisher,
23 Murray Street and 27 Warren Street
(Upstairs).

☞ Our new and revised Catalogue of American and Foreign Scientific Books, 56 p. 8vo., sent to any address, on receipt of six cents in postage stamps. 282

The New Light.

$500 REWARD

Will be paid to any one who can produce from OXYGEN GAS or any other source, a light as cheap as that supplied by the Hydrocarbon Light Company, or that can prove that one foot of New York gas cannot be made by their process to give a light equal to three feet. Suitable for all purposes of illumination. May be seen in practical operation at the Company's store, 74 Maiden-lane, or at 839 Broadway, New York, and Messrs. Oppenheim & Co.'s, 251 Fulton street, Brooklyn. 219

☞ *NEW METHOD*

FOR

LIGHTING AND EXTINGUISHING

Street and other Elevated Gas Lamps.

For Illustrated Circular containing particulars, with letter from the PRESIDENT OF THE MANHATTAN GAS-LIGHT COMPANY, and SUPERINTENDENT OF LAMPS AND GAS of the City of New York, address J. W. BARTLETT, Patentee of the AMERICAN SELF-GAS LIGHTING TORCH AND IMPROVED KEY, 569 Broadway, N. Y. 223

WILSON & GARDNER,

MANUFACTURERS OF

Clay Retorts, Fire Brick, Tile, Etc.,

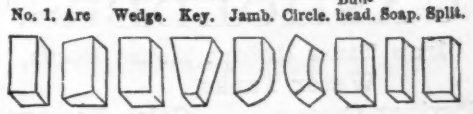
OF THE BEST QUALITY.

ALL SHAPES AND SIZES MANUFACTURED TO ORDER PROMPTLY.

Lockport, Westmoreland County, Pa.

FIRE BRICK.

No. 1. Arc | Wedge. | Key. | Jamb. | Circle. | Bull-head. | Soap. | Split.



237-1y

DUNBAR'S
Gas Retort Setter's Guide,

Or how to set a Bench of Retorts, 14 x 22, 8 feet 7 inches long, that may be worked up to a capacity of 7000 feet per Retort in 24 hours, with the various sizes of Retorts, producing the like results, or 6,500 feet per Retort a day, on an average, for six months.

With specific instructions how to successively manage the same, so as to obtain like results for six and twelve months more, thereby creating a great saving in capital and labor. Also, instructions how to burn your own Lime in a vacant oven.

Having 13 year's practical experience in Retort room, and management of Gas Works, I feel that I have attained that proficiency which will enable me to make the Work of great value to the profession.

The Work will be published as soon as 100 subscribers are received. Subscription price $5.

All desiring a copy of this valuable Work, are requested to send their names to the office of this Journal. 226-3m

---

PATENT LAMP POST.—THIS INVENTION relates to constructing Lamp Posts in two parts, viz. A base which is set in the ground, and a column or upper part which fits into the upper end of the base. By making Lamp Posts in this manner a great saving may be made in the original cost of the post, and in case the upper part of the post is broken, it is easily replaced by a new one, without the trouble and expense of digging up the old base, which frequently has to be delayed from inclemency of the weather. There is a collar around the upper end of the base, on which the base of the upper part rests. The sleeve has a number of lugs or chipping pieces projecting from its sides, which can, in a few minutes, be chipped off sufficiently to let the sleeve fit the base, no other tools being required but a hammer and chisel. In case the upper part of the post is broken so that it cannot be repaired the base is saved, which is one-third the cost of the post. In case the gas pipes become stopped by freezing or any other cause, the column can be lifted out from the base, the gas pipe (or stand-pipe) detached, the obstruction removed, and all put up in good order in the space of twenty or thirty minutes, which is a great advantage over the old posts. A cock can be put on the upper end of the bend of the gas pipe, and in case of breakage can be turned so as to shut off the gas. This is also no small item, and cannot be done with the old post. A stronger, lighter, and better casting can be made, and at the same time more sure to turn out better than the old posts.

The right to manufacture, or State rights, for sale on reasonable terms. Address DENNIS LONG & CO., Union Pipe Works and Union Foundry and Machine Shops, Louisville, Ky. 221-tf

Graham's Patent Lamp Post.

ANTI-FREEZING.

MORE SIMPLE, MORE CHEAP, MORE USEFUL LESS LIABLE TO GET OUT OF ORDER, and gives a more PERFECT LIGHT than any other Lamp Post known. It is the ONLY REALLY ANTI-FREEZIFG LAMP POST ever offered to the public. The improvement is applicable to OLD POSTS at a TRIFLING COST.

The invention consists mainly in dispensing with the interior gas pipe, by simply closing the bottom of the Lamp Post and tapping it five inches from the bottom for the service pipe. The top is fitted with a plug or stopper to take in a short piece of pipe with the stop-cock and burner. The interior of the Post thus forms a large gas chamber and condenser for all moisture and impurities which fall to the bottom, leaving the gas free and pure at the burner.

For manufacturing rights and rights to use, or other information, address

J. W. GRAHAM, Chillicothe, Ohio, or
EDITORS AMERICAN GAS-LIGHT JOURNAL, 22 Pine st., N. Y.

Providence Steam and Gas Pipe Co.,

PROVIDENCE, R. I.,

BUILDERS OF

Coal and Rosin Gas Works,

For Towns and Manufactories.

Estimates furnished of the cost of Works, and cost to manufacture Gas in any locality.

GASHOLDERS,

Iron Truss Retort House Roofs,
Water Tanks,
Purifier Covers, Coke Barrows,
Cast Iron Socket Pipe.

Particular attention given to Enlarging and Re-building Gas Works.

For Lighting Manufactories, our Rosin Gas Works have been successfully used for *many years* past. They require but a small outlay, and afford a *safe* and *economical* light.

FOR SALE AT MANUFACTURERS' PRICES:

Exhausters and Compensators,
Iron and Clay Retorts,
Fire Brick, Clay and Tile,
Roman Cement and Rosin,
Station and Consumers' Meters.

REFER TO

Manufacturers' Gas Co., Fall River, Mass.; Youngstown, Ohio, Gas Co.; New Rochelle, N. Y., Gas Co.; Homer and Cortland, N. Y., Gas Co.; Danbury, Conn., Gas Co.; North Bridgewater, Mass., Gas Co.; Cold Spring, N. Y., Gas Co.; Rockville, Conn., Gas Co.; Tauntor, Mass., Gas Co.; Pawtucket, R. I., Gas Co.

FREDERICK GRINNELL, President, J. C. HARTSHORN, Treas.
S. MILLETT THOMPSON, Secretary.

Office and Manufactory, corner of Pine and Eddy Streets, Providence, Rhode Island.

Office in Syracuse, N. Y., No. 1 Granger Block.

H. A. BRANCH, Agent.

FRESH GARDEN, FLOWER, FRUIT, HERB, TREE, SHRUB AND EVERGREEN SEEDS, with directions for culture, prepaid by mail. The most complete and judicious assortment in the country. AGENTS WANTED.

Twenty-five sorts of either for $1.00 prepaid by mail. Also Small Fruits, Plants, Bulbs, all the new Potatoes, etc., prepaid by mail. 4 lbs. Early Rose Potato, prepaid, for $1.00. Conover's Colossal Asparagus, $3 per 100; $25 per 1000, prepaid. New hardy fragrant everblooming Japan Honeysuckle, 50c each, prepaid. True Cape Cod Cranberry, for upland or lowland culture, $1.00 per 100, prepaid, with directions. Priced catalogue to any address, gratis, also trade list. Seeds on commission.

B. M. WATSON,
Old Colony Nurseries and Seed Warehouse,
Plymouth, Mass. Established in 1842.

243

GREAT IMPROVEMENT AND REVOLUTION IN

KEROSENE LIGHTS.

New houses furnished complete, and old-fashioned Lamps improved or superseded by

IVES' PATENT LAMP.

The safest, most convenient, and in every way *THE BEST LAMP EVER USED!*

Chandeliers, Brackets, Hanging and Table Lamps of all kinds can be lighted as quickly as Gas, filled and trimmed safely and neatly, all without removing the Shade, Globe, or Chimney, or unscrewing the burner!

We have in stock a complete assortment of Foreign and Domestic

KEROSENE LAMPS AND FIXTURES.

Also, a choice selection of first class

GAS CHANDELIERS,

Fitted with our improvements for oil, and specially adapted for suburban residences which have been or are to be piped for Gas, but to which the mains have not yet reached, and oil is to be used temporarily, or they can be used elsewhere as well.

IVES' PATENT LAMPS are sold by dealers generally, but to introduce them where the merchants have not yet got them, we give particular attention to RETAIL TRADE, making a specialty of furnishing SAFE STATIONARY LIGHTS, APPROPRIATED FOR EVERY PLACE WHERE GOOD LIGHT IS REQUIRED.

JULIUS IVES & CO.,
37 Barclay street, and 42 Park Place,
227 Removed from 49 Maiden Lane.

P. P. DEILY, J. FOWLER.

DEILY & FOWLER,

39 LAUREL STREET, PHILADELPHIA, PENN.,

BUILDERS OF GAS-WORKS,

MANUFACTURERS OF

GAS-HOLDERS,

WROUGHT IRON ROOFS,
CHARGING-SCOOPS, COAL WAGONS,
COKE BARROWS, AND ALL WROUGHT WORK CONNECTED WITH GAS-WORKS.

Particular attention paid to the Extension of Works and Repairs to Gas-Holders, Purifiers, Etc. Also, Builders of Water Tanks, Oil Tanks, Oil Stills, Etc.

REFER TO M. H. Jones, Easton Gas Co., Penn.
Franklin Woolman, Burlington Gas Co., N. J.
O. W. Goodwin, Camden Gas Co., N. J.
Benjamin Acton, Salem Gas Co., N. J.
D. H. Smith, Watkins Gas Co., Watkins, N. Y.
W. F. Warner, Owego Gas Co., N. Y.
E. Wilcox, Joliet Gas Co., Ill.
Messrs. Woodbury, Walter & Potter, Kalamazoo Gas Co., Michigan.
H. H. Fish, Utica Gas Co., N. Y.
W. J. Ball, Terre Haute, Indiana. (221-1yr.

GEO. STACEY. HENRY RANSHAW. WM. STACEY.

GEO. STACEY & CO.,

MANUFACTURERS OF

GASOMETERS,

Wrought Iron Roofs.

And all kinds of Wrought Iron Work used in the erection of Gas and Coal Oil Works, Wrought Iron Bridges for Railroads and other purposes, Wrought Iron Joists and Girders for Buildings, Bridge Bolts, Jails, and Cells, Etc.

Manufactory, Ramsay street, opposite O. & M. R. R. Depot,

CINCINNATI, O.

REFER TO:

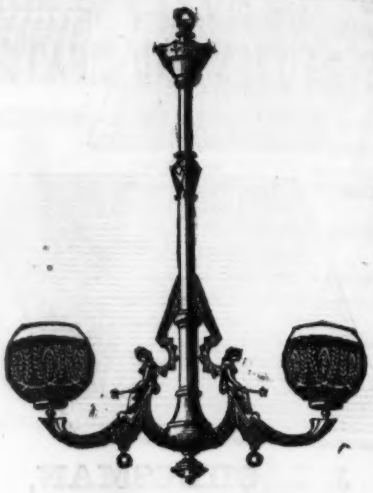
Cincinnati Gaslight Company
Cleveland, O., Gas Company.
Davenport, Iowa, Gas Co.
Nashville, Tenn., Gas Co.
Madison, Ind., Gas Company.
R. T. Coverdale, Engr., Cin.
Covington, Ky., Gas Company.
Baton Rouge, La., Gas Co.
Indianapolis Gas Company.
Dayton, O., Gaslight Company.
Terre Haute, Ind., Gas Co.

Roofs covered with either Corrugated Sheet Iron or Slate.

SITUATION WANTED.—A GAS ENGINEER of nearly twenty years experience in Building and Managing Works, is now open for an engagement. Undoubted reference furnished as to ability and moral character. Address, ENGINEER, office of thif Journal, or Box 1513, New York P. F.

FOR SALE.—THE FOLLOWING SECOND Hand Gas Apparatus: One Meter, six-inch connections; Castings for seven Benches, Mouth-pieces, Lids, Stand Pipes, Bridge and Dip-pipes, Hydraulic Main, Center Seal, Condensers, Purifying Boxes, and Connecting Pipes, all in good condition. Will sell all or any portion of the same. Address,

GEORGE K. REED,
244-3t Lancaster, Pa.



REMOVAL.

ARCHER & PANCOAST M'F'G CO.

Have removed their Manufactory and Warerooms to the NEW BUILDING,

Nos. 70, 72, and 74 Wooster Street,

(Between Broome and Spring Streets,)

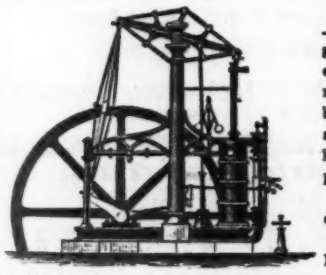
NEW YORK,

Where will be found a very extensive stock of

GAS FIXTURES,

Of their own fabrication, of every variety and pattern, tasteful in design and unsurpassed in finish, at the lowest prices.

☞ Designs for special purposes—such as Public Halls, Mediæval and Architectural Church Fixtures—Ecclesiastical Emblems—Masonic Lodges, etc., submitted on short notice. 235-1y



A GAS AND Mechanical Engineer of ten years' experience, with good references, and capable of Constructing and Working small or large Works, desires a position.

Drawings and Specifications furnished.

Call or address M. L. CALLENDER, office of this paper. 289

TO PATENTEES AND MANUFACTURERS.

SUCH REQUIRING A FIRM TO INTRODUCE their Goods by means of Special Agents in Europe, will please quote lowest prices, and full particulars, to JOHN BAILEY, & CO. Engineers, Sundrymen and Brass Founders, Albion Works, Salford Lancashire, England.

REFERENCE.—The Manchester Branch of the Liverpool and Manchester District Bank.

Good well tested novelties will receive attention.

Orders executed for all sorts of English Mechanical Goods, if accompanied with cash or a credit in England.

Five per cent. charged on amounts below £100.

Established thirty years. 247-tf

49 Walnut St., Cinl., O.

CHEAP PAINTING.—

1/2 COST LEAD

100 lbs. of the PECORA COMPANY'S COLORED PAINT (costing $12.50) will paint as much as 250 lbs. of Lead, and wear longer. For particulars, address S. BOWEN, Sec'y. No. 150 North 4th St., Philada. or 75 Maiden Lane, N. Y.

BOILER CEMENT.

(Extract from Testimonial from Merrick & Sons' Southwark Foundry, Philadelphia.)

"Mr. S. BOWEN, Secretary Pecora Lead Company:—Your Metallic Cement is better than Red or White Lead for making Steam Joints, or Patching. Hot rivets do not affect the Cement; we use it in joints of light tanks, in the place of caulking, and they do not leak. We use it also on gas-holders.

"J. J. GREENFIELD.
"Foreman of Boiler Department.

(Extract from Testimony from Superintendent Chelsea Gas Co., Massachusetts.)

"We are much pleased with the Pecora Paint; it is just what Gas Company's want; it dries while the water is running down the holders; and we would not hesitate to have them settle immediately.

"The Pecora Company's Steel Color is remarkable for the beauty and finish given to machinery and all iron work, giving a finish superior to any paint yet introduced and used by Wm. Sellers & Co., Merrick & Son's, and others."

Offices, { New York, 70 Maiden Lane. Philadelphia, 150 N. 4th Street.

GAS STOVES AND HEATERS.

HEATER NO. 3. HEATER NO. 4.

METROPOLITAN

Odorless Gas Heating and Cooking STOVES AND RANGES.

A. L. Bogart's Patent, Nov. 26, 1867.

The only inodorous Gas Heaters made in the world.
Salesroom, 702 Broadway, fourth door above Fourth st., N. Y.

ASHCROFT'S

Patent Low-Water Detector,

FOR PREVENTING THE EXPLOSION OR

Burning out of Steam Boilers.

More than 7,000 of these Instruments now in use.

PRICE, $50.

The Detector insures your boiler against burning out or exploding, and against the collapsing of flues, which is caused by low water.

JOHN ASHCROFT,
205tf 50 John-street, New-York.

NATIONAL FOUNDRY AND PIPE WORKS.

Office and Works—Carroll, Pike, Smallman and Wilkins Streets,

PITTSBURGH, PA.

WM. SMITH,

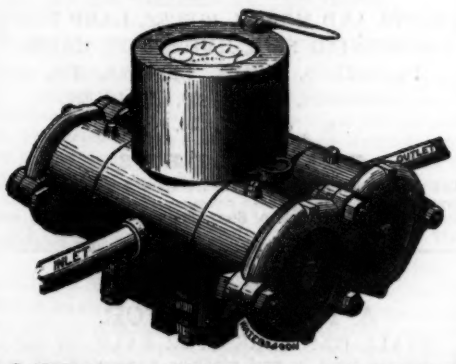
Manufacturer of all kinds of GAS and WATER PIPE, BRANCHES, CONNECTIONS, T's, ELBOWS, and ALL CASTINGS USED AT GAS AND WATER WORKS.

offer special inducements to parties wishing to purchase, my Pipe is Smooth, regular in weights, and cast vertically.

N. B.—Pipe from 8-inch and upwards, cast in 12-ft. lengths.

☞ SEND FOR CIRCULAR AND PRICE LIST. ☜
149

H. R. WORTHINGTON'S



PATENT WATER-METER.

This Meter is also used for the measurement of Oil —it combines

ACCURACY, SIMPLICITY, and REMARKABLE DURABILITY with such ease and certainty of motion, as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities, with its low cost, have caused its extensive adoption by corporations and individuals, in many of our largest cities.

HENRY R. WORTHINGTON,
61 Beekman steet, N. Y.

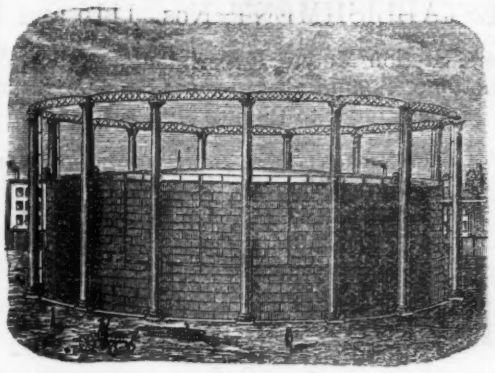
T. F ROWLAND.

Continental Works,

Greenpoint, Brooklyn, N.Y.

NEW YORK OFFICE, 64 & 66 B'WAY, ROOM 33.

ENGINEER, AND MANUFACTURER OF



GAS-HOLDERS

OF ANY MAGNITUDE,

Condensers, Scrubbers, Purifiers, Retorts, Hydraulic Mains, and all other articl s connected with the Manufacture and Distribution of Gas, furnished with despatch: Plans and Specifications prepared, and Proposals given for the necessary Plans for Lighting Cities, Towns, Mansions, and Manufactories.

PROFESSOR HENRY WURTZ,

SCIENTIFIC AND PRACTICAL CHEMICAL AND GEOLOGICAL EXPERT.

26 Pine Street, Room 36, New York.
(Office Hours 1 to 4 daily, except Saturdays.)

Geological Explorations and Reports—Chemical Analyses—Advice and Investigations in all the Chemical Arts—Chemical Inventions and Improvements made.

[Professor W. makes a specialty of GAS-CHEMISTRY, and the Analysis of Gas and Gas Coals. Has unequalled facilities for this purpose; is an Editor of the AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY.

Formerly a Chemical Examiner in the U. S Patent Office; and peculiarly competent in relation to Patent Rights, Contested Cases and Infringements.]

JESSE W. STARR & SONS,

Camden Iron Works,

Camden, New Jersey,

MANUFACTURERS OF

All kinds of Castings and Apparatus for Gas Works,

WROUGHT IRON ROOF FRAMES,

for Retort and other houses. Retorts and all castings required for setting them in the latest and most improved model. WASHERS, CONDENSERS, SCRUBBERS and EXHAUSTERS, for relieving the Retorts from pressure. PURIFIERS, varying from 2,000 to 2,000,000 cubic feet daily purifying capacity.

Wrought Iron Lime Sieves,

for Purifiers. Station Meters of all sizes.

GAS HOLDERS,

Telescopic and Single,

with cast iron guide and suspension frames. GAS GOVERNORS or REGULATORS. STREET MAINS, from 1½ to 48 INCHES DIAMETER, for WATER or GAS. Street Main connections, such as BRANCHES, BENDS, DRIPS, SLEEVES, etc.

STOP VALVES, from 3 to 30 inches, for both Water and Gas.

WROUGHT IRON WORK.

All the Smith and Sheet Iron work required in and about Gas Works. 226-tf

JESSE W. STARR. BENJ. A. STARR. BENJ. F. ARCHER.

REMOVAL.

THE

EMPIRE SEWING MACHINE COMPANY

HAVE REMOVED TO THEIR NEW STORE,

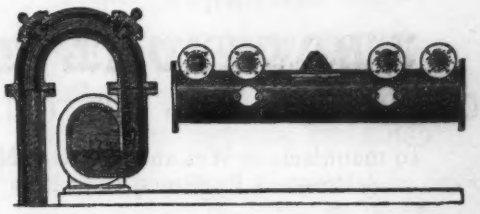
294 *BOWERY, Bet. HOUSTON & BLEECKER-Sts.*

Their new Factory is now in full operation which will enable them to fill all orders promptly. Their improved No. 2 and No. 3 Machines for Family and Manufacturing purposes are not only equal but superior to any other machine in market.

EMPIRE SEWING MACHINE CO.,

294 *BOWERY, NEW-YORK.* (206

STANLEY'S HYDRAULIC GAS MAIN.



WILLIAM TAYLOR & SONS,

COLUMBIAN IRON WORKS,

Nos. 11, 13 & 15 Adams Street, Brooklyn, N. Y.

MANUFACTURERS OF ALL KINDS OF

Castings. Iron Buildings. Store Fronts, Columns, Girders and Beams.

ALSO,

Gas Works Castings of all kinds.

Steam Engines, Mill Gearing, Hydraulic Presses for the manufacture of Linseed and Cotton Seed Oils, Sugar Mills, Single and Double Action Pumps, also Steam Pumps, Coal Oil Machinery, High and Low Pressure Boilers, Tanks, Kettles, Soap Curbs, &c.,

MADE AND REPAIRED AT THE SHORTEST NOTICE.

WM. TAYLOR. JAMES A. TAYLOR. EDWIN S. TAYLOR.

GLOUCESTER IRON WORKS,

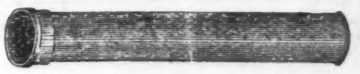
GLOUCESTERCITY, CAMDEN COUNTY, N. J.,

MANUFACTURE

CAST IRON GAS AND WATER PIPE,

STOPVALVES FOR GAS OR WATER,

GASHOLDERS. 223



B. S. BENSON & SON.

ALLENTOWN, PA.,

MANUFACTURERS OF CAST IRON

GAS AND WATER PIPE,

AND FITTINGS FOR

GAS AND WATER MAINS, ETC.

Cast Vertically, in Lengths of 12½ Feet, and all Sizes from 3 to 30 inches.

Orders filled with Promptness and Despatch, and Warranted to give Satisfaction.

☞ Works and Office, Lehigh Valley, Allentown, Pa. 222-1yr

SCHOOL OF MINES,

COLUMBIA COLLEGE,

EAST 49th STREET, NEW YORK.

FACULTY:

F. A. P. BARNARD, S.T.D., LL.D., President.
T. EGLESTON, JR., E. M., Mineralogy and Metallurgy.
FRANCIS L. VINTON, E. M., Mining Engineering.
C. F. CHANDLER, Ph. D., Analytical and Applied Chemistry.
JOHN TORREY, M.D., LL.D., Botany.
CHARLES A. JOY, Ph.D., General Chemistry.
WILLIAM G. PECK, LL.D., Mechanics.
JOHN H. VAN AMRINGE, A.M., Mathematics.
OGDEN N. ROOD, A.M., Physics.
JOHN S. NEWBERRY, M.D., Geology and Palæontology.

The plan of this School embraces a three years' course for the degree of ENGINEER of MINES, or BACHELOR of PHILOSOPHY.

For admission, candidates for a degree must pass an examination in Arithmetic, Algebra, Geometry and Plain Trigonometry. Persons not candidates for degrees are admitted without examination, and may pursue any or all of the subjects taught. For further information and for catalogues, apply to

DR. C. F. CHANDLER
80-1yr. DEAN OF THE FACULTY.

TURNBULL'S AUTOMATIC PURIFIER.

STATE RIGHTS FOR SALE ON LIBERAL terms. For further information address by letter, WM. C. TURNBULL, care of I. C. Babcock, 59 Broadway, or to the Editors of this Journal.

HARRIS & BROTHER,

ESTABLISHED 1848.

PRACTICAL GAS METER MANUFACTURERS,

Continue as heretofore at the OLD ESTABLISHMENT, Nos. 1115 and 1117 Cherry Street, Philadelphia, Pa.,

To manufacture Wet and Dry Gas Meters, Station Meters, Experimental Meters, Meter Provers, Centre Seals, Governors, Pressure Registers, Indicators, Photometers, and all kinds of Gas Apparatus; Also furnish all other Articles appertaining to the use of Gas Works.

From our long Practical Experience of the Business (covering a period of 20 years) and from our personal supervision of all Work, we can guarantee all orders to be executed promptly, and in every respect satisfactorily.

J. Wesley Harris, Washington Harris, Wm. Wallace Goodwin.

THE AMERICAN METER CO.

Organized under the General Manufacturing Laws of the State of New-York.

SAMUEL DOWN, PRESIDENT. HENRY CARTWRIGHT, VICE-PRESIDENT. RICHARD MERRIFIELD, SECRETARY AND TREASURER.

TRUSTEES:

SAMUEL DOWN, WILLIAM HOPPER, R. H. GRATZ, HENRY CARTWRIGHT, RICHARD MERRIFIELD. THOMAS C. HOPPER, Superintendent at Philadelphia.

This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS AND REGISTERS, SERVICE and METER COCKS, and all articles in their line appertaining to the use of Gas Works.

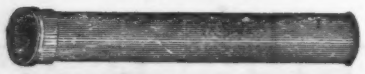
The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy and excellence of Workmanship. Orders addressed

AMERICAN METER COMPANY,

West Twenty-Second Street, New York. Arch and Twenty-Second Streets, Philadelphia. No. 23 West, Street, Boston, will meet with prompt attention

B. S BENSON,

MANUFACTURER OF



CAST IRON PIPES AND FITTINGS

FOR

GAS AND WATER MAINS.

All sizes from 3 to 30 inch cast vertically in 12½ feet lengths.

Office and Factory 52 East Monument street.

BALTIMORE MD. [184

CAST IRON GAS AND WATER PIPE,

AND FITTINGS FOR SAME.

SMITH & ELLIS,

IRON FOUNDRY,

YORK AND MOYER STREETS,

PHILADELPHIA.

☞ Gas Works Castings of all kinds. 233-3m

PREMIUM GAS STOVES.

New, Cheap Clean, Simple and Healthful.

No odor, no dirt, no soot, no ashes, no coal box, no punching and renewing fires.

THE CAMBRIDGE GAS STOVE.

This truly scientific invention received the premium at the State Fair at St. Louis, and is being introduced at the West and also in the New England States with great success. Certificates of its excellence and superiority from some of our most scientific and influential men have voluntarily given, and will be furnished upon application.

These stoves may be seen in operation at Messrs. Bliss & Co.'s, 95 Bleecker street, or at No. 22 Pine street, Room 10, where information may be obtained.

WORTHINGTON'S STEAM PUMP.

Extensively used by

GAS-LIGHT COMPANIES,

For sale at greatly reduced prices. Also, a new and highly successful Pump, driven by water pressure, requiring no attention or repairs, and the most economical water motor yet constructed.

Patent Gates for Water and steam-stops.

HENRY R. WORTHINGTON,

61 Beekman-st. New York.

BROOKLYN TUBE WORKS.

B. T. BENTON,

MANUFACTURER OF

WROUGHT IRON AND GALVANIZED

TUBES,

For Steam, Water, or Gas.

MANUFACTORY AND OFFICE,

Corner John and Adams Street, Brooklyn

ALSO

58 John Street New York. 171

WILLIAM S. CARR & CO.,

Succesor to Sawyer & Co.,

SOLE MANUFACTURERS OF

Carr's Patent Water Closets,

SURINAL VALVE, &c.

Also Manufacturers and Dealers in PLUMBING MATERIALS OF EVERY DESCRIPTION, Plumbers' Brass Works, Earthen Ware, Pumps, Iron Drain Pipes, Traps and Sinks, Copper Bath Tubs, Showers, &c., &c.

MANUFACTORY, MOTT HAVEN.

106, 108, and 110 Centre Street, cor. Franklin.

NEW YORK.

Illustrated Catalogue and Price List sent on application. 152-176

THE AUBIN BALANCED

VALVE WATER METER,

(Used also for Oils and Liquors)

IS NOW IN USE BY MANY CITY WATER Companies, because of its Low Price, Simplicity, Durability, Accuracy under any Pressure, and, (a great advantage,) because it runs with less head than any other meter used.

Manufactured by

H. Q. HAWLEY,

Albany, N. Y.

J. H. TIEMANN.

ANALYTICAL CHEMIST,

Metallurgist & Mining Engineer

☞ GOLD AND SILVER BOUGHT.

165 CHAMBERS STREET, N. Y.

tf

DENNIS LONG & CO.,

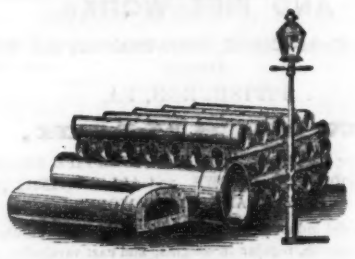
UNION PIPE WORKS!

LOUISVILLE PIPE FOUNDRY,

AND

Union Foundry and Machine Shops

LOUISVILLE, KY.



MANUFACTURE

CAST IRON GAS AND WATER PIPE.

All Pipe Cast Vertically in Dry Sand.

2 inch Pipes in 8 feet lengths. 3 inch to 60 inch cast in 12 feet lengths.

RETORTS AND MOUTH PIECES, LAMP POSTS CONDENSING PIPE, HYDRAULIC MAINS, PURIFIERS, DRIPS, ELBOWS, T'S, CROSSES, SLEEVES, VALVES, &c., &c., &c.

GAS-HOLDERS.

And every description of work necessary for Gas or Water Companies.

Steamboat and all kinds of Steam Engines Blacksmithing and Heavy Castings. 233

SPECIAL NOTICE.

A RARE CHANCE.

A SMALL GAS WORKS FOR SALE, ON REASONABLE terms, in good condition, now paying well, and rapidly improving. Location, New York State, in a thriving and beautiful town. This is an excellent chance for investment, and especially so, for a gas man. Apply to M. L. Callender, office of GAS LIGHT JOURNAL, 22 Pine Street New York. 239

FOR SALE.

A SET OF FOUR ROUND CAST IRON PURIFIERS, with Covers, Center, Seal, six inch Connections, and three layers of Malleable Iren Trays, capable of purifying from 35,000 to 40,000 fee of Gas in 24 hours. Also Door Frames, Pans and Braces sufficient for four benches. They can be seen at the Yonkers Gas Works, Yonkers, N. Y. 243-2t.

JOSEPH NASON & CO.,

No. 61 Beekman street, corner of Gold,

NEW YORK.

Manufacturers of WROUGHT IRON PIPES and Fittings for Steam, Gas and Water, Boiler Flues, Steam Boilers, Coils, Heaters, Evaporators, Pumps, Ventilating Machinery, and Apparatus for Warming Buildings by Steam and Hot Water.

OIL TUBING, CAST IRON DRIVING PIPE,

Boring Tools, Oil Pumps, Sand Pumps, Stuffing Boxes, Tongs, Clamps, Swivels, Joints, &c. 131

THE AUBIN BALANCED

VALVE WATER METER,

(Used also for Oils and Liquors)

now in use by many City Water Cos, because of its low price, simplicity, durability, accuracy under any pressure, and (a great advantage) because it runs with less head than any meter used.

Manufactured by H. Q. HAWLEY, Albany, N. Y.

MORRIS, TASKER & CO.,

PASCAL IRON WORKS.

[ESTABLISHED 1821.]

PHILADELPHIA,

Manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap-Welded Boiler Flues,

GALVANIZED WROUGHT IRON TUBES,

ARTESIAN WELL PIPES,

of Wrought or Cast-Iron, screwed together, flush inside and out; Gas-works Castings, Retorts and Bench Castings for Coal Gas-works,; Cast-Iron Street Mains, Bends, Branches, Drips, &c.

Gas and Steam Fitters' Tools, &c.

Stephen Morris. Stephen P. M. Tasker.
Thomas T. Tasker, Jr. Henry G. Morris.

Office and Wareroom, 15 Gold-street, New York.

GEO. H. KITCHEN & CO.,

NEW PATENT

GAS APPARATUS

For Country Residences, Public Buildings, &c.,

FROM $300 UPWARDS.

EVERY DESCRIPTION OF GAS FIXTURES.

Gas Fitting in all its branches

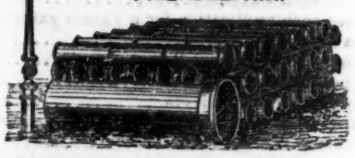
591 Broadway NEW YORK.

R. D. WOOD & CO.,

MANUFACTURERS OF

CAST-IRON PIPE, RETORTS, &c.

Office, 400 Chestnut Street, PHILADELPHIA.



S. H. HENDERSON, Selling Agent,

No. 173 BROADWAY, 2ND FLOOR.

HOW TO SAVE FUEL.—KEEP WARM.

THE ADVERTISER IS THE INVENTOR AND Patentee of a new System to Utilize Waste Steam for Heating Factories, Mills and all buildings where steam power is used. Also, for Dyers, Soap Makers, Etc. The saving in Fuel is from 25 to 40 per cent! which can be proved by numerous testimonials of those who are employing this system. Orders to have the system applied may be directed to Joseph Shackelton, 22 Pine-st., Room 10, or at 45 Courtlandt-street, New York.

Appended are a few of the many Testimonials received:—

Newark, July 21, 1868.

Mr. Joseph Shackelton has just completed an arrangement by which we are enabled to apply the exhaust steam from our engine for the purpose of heating water used for dyeing, felting, scouring and other purposes. We have made a careful test of the amount of fuel saved by the use of this arrangement, and find it to be from forty to fifty per centum. MOORE & SEELY BROS.

Newark. N. J., December 18, 1868.

Mr. Joseph Shackelton—Sir: This is to certify that I am using your system of using the exhaust steam from my engine. It has been in operation for three months, and works satisfactory in all respects. I find a saving of coal of about 50 per cent.

JOS. GUILAM.

We have used Mr. Shackelton's patent system of heating our cities and factory by exhaust steam for seven months We find at there is a saving of coal of about 50 per cent.

218tf YATES, WHARTON & CO.

MURRAY & BAKER.

PRACTICAL BUILDERS

AND CONTRACTORS FOR THE

ERECTION OF GAS WORKS.

Manufacturers of all the latest and most improved

APPARATUS AND TOOLS

FOR THE

Manufacture and Distribution of

COAL GAS.

WORKS AT THE RAILWAY DEPOTS,

FORT WAYNE, INDIANA.

We manufacture Bench Castings, Washers, "The Immersed Multitubular," and Atmospheric Condensers, Wet and Dry-Lime Purifiers, Dry Center Seals, Telescopic and Single Gas Holders Wrought Iron Trussed Roof for Iron or Slate, Wood and Iron Trays for Purifiers, Coke and Coal Carts, Wrought Iron Screening Shovels, and Castings and Wrought Work of every description for Gas-works.

As Mr. Murray is a Practical Draughtsman, we will furnish plans and specification to parties or Associations, or will wait personally upon parties contemplating the construction of new works, or the alteration or extension of old ones.

The most satisfactory references can be given, if required, of the experience and commercial fairness which characterizes our dealings.

We would respectfully invite Western men to call and see our patterns and works here. MURRAY, & BAKER,
198-1y Fort Wayne, Indiana,

J. VAUGHAN MERRICK, W. H. MERRICK, JOHN E. COPE.

SOUTHWARK FOUNDRY,

FIFTH AND WASHINGTON STREETS,

PHILADELPHIA.

MERRICK & SONS, Engineers,

MANUFACTURERS OF EVERY DESCRIPTION OF GAS MACHINERY.

Retorts, Bench Castings, Condensers, Washers, Scrubbers, Wet or Dry Lime Purifiers, Coke Wagons, Fire Tools, Wrought Iron Grate Bars, Gas-holders, either Telescopic or Single, with Suspension Frames complete; Wrought Iron Roof-Frames, for Iron or Slate; Stop Cocks, Exhausters, Steam Pumps, Boilers and Tanks, Steam or Hand Air Pumps for proving Street Mains, Centre Seals, Governors, Wrought or Cast-Iron, Line Sieves for Purifiers, Hoisting Machines for Lifting Purifier Covers.

Address— MERRICK & SONS,
5th and Washington Sts, Philadelphia.

BALTIMORE RETORT AND FIRE BRICK WORKS.

GEO. C. HICKS & CO.

Clay Retorts for Gas Works, Sugar Refineries, Settings for both Clay and Iron Retorts; Fire Brick of unusual Refractability.

GEORGE C. HICKS.
AUGUSTE LAMBLA, ZENO F. PARUS,

JAMES J. WALWORTH & CO.,

No. 1 Bath Street, Boston, Mass.

MANUFACTURERS OF

LAVA GAS TIPS.

They are equal, if not superior, to the imported Tips, and are much lower in price. Manufacturers of, and wholesale dealers in

Brass and Iron Gas Burners, Burner Pillars Gas Plyers. Brown's Patent Pipe Tongs, Stanwood's Patent Pipe Cutters, Burner Cleaners, Hill's Patent Solid Dies.

Malleable Iron GAS and STEAM FITTINGS. Importers of SCOTCH TIPS. 238–6m

---

C. GEFRORER,

Manufacturer of

GAS-BURNERS,

For Lighting and Heating Purposes.

GAS HEATING AND COOKING APPARATUS; FITTERS' PROVING APPARATUS, &c.

529 Commerce st., bet. Market & Arch st., Phila., Pa

PURIFIERS, ETC., FOR SALE.

EIGHT CAST IRON PURIFYERS, FOUR FEET square, eighteen inches deep, with three tiers of Trays to each, and with Wrought Iron Covers.

Four CAST IRON WASHERS, five feet in diameter, eighteen inches deep.

One CENTRE SEAL complete with the connections, consisting of Pipes, Elbows, Tee Pieces, etc.

The above are all in good order, and will be sold low. Address
W. P. JOHNSTON,
Secretary Gas-Light and Coke Company,
2-4t Mobile, Ala.

OREGON IRON FOUNDRY

738, 740, 742 and 744,

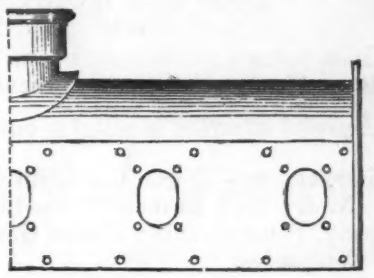
Greenwich Street, New York.

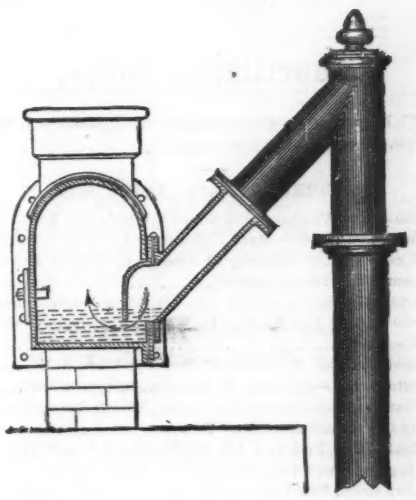
CASTINGS FOR

GAS WORKS

OF ALL DESCRIPTIONS, INCLUDING

Purifiers, Exhausters, Compensators, Self-Acting Valves, Branches, Bends, &c.





Floyd's Patent Adjustable Main.

FOR BENCHES OF 1, 2, 3, 5 and 6 RETORTS.

By the removal of the front plate only the Main can be adopted to Settings of any number of Retorts desired. The Patent Main can be applied to the ordinary D shaped Main. It offers great facilities for cleaning, and is not liable to stoppage.

FLOYD'S PATENT

Malleable Iron Retort Lid.

SABATTON'S PATENT

Furnace Door and Frame.

REFERS TO—J. A. Sabattan, Esq., Engineer Manhattan Gas Co—Col. A J. White, Metropolitan Gas Co.—C. C. Mowten, Engineer New-York Gas-light Co.—J. Mowten Saunders, Engineer Baltimore Gas Co.—John T. Harrison, Engineer Savannah Gas Co.

36] HERRING & FLOYD, Proprietors

SILAS C. HERRING. JAMES R. FLOYD

NEW PATENT PIANOS.

RAVEN & BACON.

(Established 1829.)

Warerooms Nos. 644 & 646 Broadway, N. Y.

Manufacturers of Piano Fortes, with their Patent Combination Sounding-boards,

PATENTED AUGUST 14th, 1866

This invention, introduced exclusively into our Pianos, is of the greatest advantage to the tone of the Instrument, as it affects the sounding-board, the very soul of the Piano, and produces thereby a pure liquid tone greatly superior in quality and power to that of the ordinary Piano. The sounding-board released from its connection with the Piano case, and resting upon under sounding-boards, is relieved from the rigidity caused by such connection, and its vibratory quality increased. Our Pianos are first class in every respect, and purchasers will have not only our own guarantee as to their quality, but also the guarantee of the reputation of the instrument, obtained from the experience of our patrons who have used them for a generation. All lovers of this eminently household instrument, as well as parties proposing to purchase new Pianos, are invited to call and examine our assortment.

MORRIS, TASKER & CO.,

PASCAL IRON WORKS.

ESTABLISHED 1821,

Offices 209 South 3rd Street, Philadelphia, and 15 Gold Street, New York.

FOR GAS WORKS MACHINERY, ADDRESS 209 SOUTH THIRD STREET, PHIL.

Manufacturers of Wrought Iron Tubes for Gas, Steam and Water, Lap-welded American Charcoal Iron Boiler Tubes, Iron and Brass Fittings, and Gas and Steam Fittings of every description.

Especial attention is called to our IMPROVED COAL GAS MACHINERY.

REFERENCES—Detroit Gas-Light Company, Michigan: Elizabeth Gas-Light Company, N. J.; Hudson City Gas-Light Company, N. J.; New Brunswick Gas-Light Company, N. J.; Lancaster Gas-Light Company, Pennsylvania; Williamsport Gas-Light Company, Pennsylvania; Elmira Gas-Light Company, N. Y.; Chicago Gas-Light and Coke Company, Illinois: also a number of other Companies.

STEPHEN MORRIS, THOS. T. TASKER, Jr., STEPHEN P. M. TASKER, HENRY G. MORRIS.

Advertising Index.

☞ In looking for advertisements, see figures 1 to 9, within brackets, at head of advertisement pages.

GAS-BURNERS, APPARATUS ETC

American Meter Company, 512 West 22d street, New York..... 8
Automatic Gas Purifier—State Rights for sale—Wm. C. Turnbull, care of T. C. Babcock, 59 Broadway, or office of the AMERICAN GAS-LIGHT JOURNAL..... 7
Cambridge Gas Stoves, Ranges, &c.—Gas Light Journal Offices, 8
Contractors for Gas-Works, Etc.—Murray & Baker, Fort Wayne, Ind..... 9
Fairmont Gas Coal Co.—Office, 47 Exchange Place, N. Y 3
Gas Retorts, Etc.—George C. Hicks & Co., Baltimore, Md..... 9
Gas Fixtures, Etc.—Archer & Pancoast Manufacturing Co., 9, 11 and 15 Mercer street, New York..... 6
Gas Coals—Bird, Perkins & Job, 104 Wall street, New York..... 3
Gas Engineers and Contractors—Hoy, Kennedy & Co., 111 Liberty street, New York..... 5
Gas-Burners—C. Gefrorer, 529 Commerce street, Philadelphia, Pa..... 9
Gas Meter Manufacturers—Harris & Bro., 1117 Cherry street, Philadelphia, Pa..... 8
Gas Apparatus, &c.—Geo. H. Kitchen & Co., 561 Broadway.... 9
Gas Burners—T. G. Arnold, 224 and 226 West 21st st., N. Y. .. 9
Gas Stoves—A. L. Bogart, 792 Broadway..... 7
Gasometers, Etc—George Stacey & Co. Cincinnati, O..... 6
Gas Fixtures, Etc.—Mitchell, Vance & Co., 597 Broadway..... 4
Gasholders, Etc.—Delly & Fowler, 39 Laurel street, Philadelphia 6
Gas and Water Pipes—R. D. Wood & Co., Phil..... 2
Gas and Water Pipes—B. S. Benson & Son, Allentown, Pa..... 7
Gas Coals—F. H. Odiorne, 146 Broad st., Boston, or C. B. Swain, 137 Front street, N. Y..... 2
Gasometers, &c.—Keystone Iron Works—2132 Filbert st., Phil. 4
Gas and Kerosene Fixtures—Tucker Manufacturing Company, 39 and 41 Park Place, N. Y., and 119 Court street, Boston.... 2
Jersey City Gas Meter Works. 14 Morris st., Jersey, N. J..... 5
Ludlow Valve Mf'g Co., 193 River street, Troy, N. Y 4
Lava Gas Tips, etc., etc.—James J. Walworth & Co., 2 Bath st., Boston, Mass..... 9
Oil and Rosin Gas Works—John Butler, 126 Maiden Lane, New York..... 2
Patent Conically Slotted Wood Trays—John L. Cheesman, 147 and 149 Ave. C., N. Y 5
Patent Gas Exhauster—Smith & Sayre, 95 Liberty st... 4
West Fairmount Gas Coal Mines, Office, Baltimore Md..... 9
Wooden Gas and Water Pipe—Wyckoff Bros. & Co., Elmira.... 4

FOUNDRIES.

Brooklyn Tube Works—B. T. Benton, Brooklyn..... 8
Columbian Iron Works—Wm. Taylor & Sons, 11, 13 and 15 Adams street, Brooklyn, N. Y..... 7
Cast Iron Pipes and Fittings—B. S. Benson, 52 East Monument street, Baltimore, Md..... 8
Continental Works—T. F. Rowland, Greenpoint..... 7
Camden Iron Works, Camden, N. J.—Jesse W. Starr & Sons... 7
FireProof Brick Works, Baltimore, Md.,—John S. & George R. Berry..... 2
Gloucester Iron Works, Camden, N. J..... 7
Louisville Pipe Works—Dennis Long, Cor. 9th and Water-sts., Louisville, Ky..... 8
National Foundry and Pipe Works—Wm. Smith, Carroll, Pike, Smallman and Wilkins streets, Pittsburgh, Pa..... 7
Oregon Iron Foundry—Herring & Floyd, 738, 740, 742 and 744 Greenwich street, New York..... 9
Pascal Iron Works—Morris, Tasker & Co., Philadelphia, Pa... 9
Retorts, Pipes, &c.—R. D. Wood & Co., 400 Chestnut street, Philadelphia..... 8
Southwark Foundry—Merrick & Sons, Fifth and Washington streets, Philadelphia..... 9
Wrought Iron Pipes, etc.—Joseph Nason & Co., 61 Beekman street, New York..... 8

WATER METERS, PUMPS, ETC.

Ashcroft's Low-water Detector, 50 John street, New York..... 7
Aubin Water Meter—H. Q. Hawley, Albany, N. Y..... 8
Cast Iron Gas and Water Pipe—Smith & Ellis, York and Moyer streets, Philadelphia..... 8
Cast Iron Pipes for Water and Gas—Riley A. Brick, 59 White street, N. Y..... 2
Steam Pumps—H. R. Worthington, 61 Beekman st. New York.. 8
Valves for Water, Steam and Gas—Ludlow Valve Man'g Co., 193 River street, Troy, N. Y..... 4
Water Pipes, etc.—S. Fulton & Co. 412 Walnut street, Phila..... 1
Water Closets, etc.—Wm. S. Carr & Co. 149, 151, 153, 155, 157 Centre street, New York..... 8
Worthington's Water Meters—H. R. Worthington, 61 Beekman street, New York..... 7

CLAY RETORT WORKS.

Baltimore Retort and Fire Brick Works—George C. Hicks & Co. 9
B. Kreisher, Clay Retorts, Etc., 58 Goerck street, New York.... 5
Brooklyn Clay Retort Works, Van Dyke st. Brooklyn, N. Y..... 5
Jersey City Fire Brick Works.—J. H. Gautier & Co., Greene, Essex and Bergen streets, Morris Canal Basin, N. J..... 5
Laciede Fire Brick Works, 1007 North Levee, St. Louis, Mo..... 5
Manhattan Clay Retort Works, 15th st. near Av. C, New York... 5
Philadelphia Fire Brick Works, Vine and 23d sts. Philadelphia.. 5
Clay Retorts, Fire Brick, Tiles, etc.—Wilson & Gardner, Lockport, Westmorland County, Pa..... 5

MINING MACHINERY, ETC.

Broker in Mining Stocks—C. H. Smith 145 B'way, New York.... 4
Mining Engineer—J. H. Tiemann, 240 Pearl st. New York..... 8
School of Mines, Columbia College, East 49th st..... 7

LAMPS, STOVES, PETROLEUM, ETC.

Branson's Patent Lamp Post—Editors Gas-Light Journal, No. 42 Pine street, N. Y..... 2
Lamps, &c.,—Julius Ives & Co., 49 Maiden Lane, N. Y... 6
Patent Lamp Post—Dennis Long & Co., Louisville, Ky..... 5
Street and Depot Lamp—Heath & Smith Manufacturing Co., 44 Murray street, N. York and 52 Randolph st., Chicago, Ill.... 2

MISCELLANEOUS.

Analytical Chemist—J. H. Tieman, 165 Chambers st., N. Y..... 8
Boiler Cement—Offices, 70 Maiden Lane, New York and 150 N. Fourth street, Phil..... 6
Humphrey's Condensed Drill, Reamer and Tap..... 2
Despard Coal, 32 Pine street, N. Y..... 2
Gas-Light Journal American and Foreign Patent Agency..... 10
Professor Henry Wurtz—Office Gas-Light Journal..... 2
Pianos—Raven & Bacon, 644 and 646 Broadway, N. Y..... 9
Patent Instantaneous Gas Lighter—J. W. Bartlett, 569 Broadway, New York..... 5
Screening Shovels—O. R. Butler, 126 Mhiden Lane, N. Y..... 2
Sellars Cement for Repairing Broken Fire-clay Retorts, etc. etc Herring and Floyd, 742 to 746 Greenwitch street N. Y..... 2
The Newburgh Orrel Coal Company—Chas. W. Hays, Agent in New York, Trinity Building, 111 B'way, Room 7..... 2
Works Upon Gas—D. Van Nostrand, 23 Murray street and 27 Warren street, N. Y..... 5

To Inventors and Patentees.

This JOURNAL, circulating, as it does, throughout the United States, Canadas, and portions of Europe, is a superior medium for advertising.

Upon receipt of $3 we will send the JOURNAL one year, and give a description of any new invention in a space not to exceed ten lines in the "Inventors' Department."

We also take out Patents in the United States and Europe, obtain Extensions, and make a *Specialty* of difficult and abandoned cases.

M. L. CALLENDER & CO.,
No. 42 Pine street, New York.

GAS-LIGHT JOURNAL
AMERICAN AND FOREIGN PATENT AGENCY.

M. L. CALLENDER & CO., Proprietors of the AMERICAN GAS-LIGHT JOURNAL, having perfected arrangements, are now prepared to offer their services to inventors as Solicitors of

American and Foreign Patents.

We have associated with us parties who have been directly connected with the Patent Office for many years, and have acquired an experience in Patent matters of over *twenty* years

We have also unusual facilities for obtaining Patents in the various European countries with *certainty and despatch.*

Oral and written opinions as to whether inventions contain features of patentable novelty, will be given upon personal or written application, *free of charge.*

We supply finished drawings by the best artists, and where necessary the model also. A circular, containing a list of fees and other valuable information as to the preliminary steps to be taken in obtaining Patents at home and abroad, will be furnished by addressing

M. L. CALLENDER & CO.
Solicitors of Patents, 42 Pine street.

Inventors' Department.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:

On filing each Caveat	$10
On filing each application for a Patent except for a Design	15
On issuing each original Patent	20
On appeal to Commissioner of Patents	20
On application for Re-issue	30
On application for Extension of Patent	50
On granting the Extension	50
On filing a Disclaimer	10
On filing application for Design (3½ years)	10
On filing application for Design (7 years)	15
On filing application for Design (14 years)	30

THE AMERICAN GAS-LIGHT JOURNAL.

AND

CHEMICAL REPERTORY,

is published at No. 22 Pine Street, opposite the Sub-Treasury Building on the 2d and 16th of every month, and is a recognised official organ of—

LIGHT, HEAT MINING INTERESTS.

PETROLEUM, WATER-SUPPLY, AND

SCIENTIFIC SUBJECTS GENERALLY.

TERMS.

SUBSCRIPTION—Three dollars per annum in advance.

AGENTS.

NEW YORK—AMERICAN NEWS COMPANY, 119 and 121 Nassau street.
BOSTON—S. M. PETTENGILL & Co., No. 6 State Street.
PHILADELPHIA—COE, WETHERILL & Co., Ledger Building, Phil'a.
Germany.....B. WESTERMAN & Co., of New York.
Great Britain....TRUBNER & Co., 60 Paternoster Row, London
France..... LE JOURNAL DE L'ECLAIRAGE AU GAZ, 25 Boulevard Poissonnière
Brussels, Belgium—HENRI BERGE.

☞ All communications to be addressed to "The Editors," No. 42 Pine Street, New York.